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Social Origins and Destinations of Colombian Graduates

WAXMANN

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edited by
Christel Adick and Marcelo Parreira do Amaral

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Contemporary societies are strongly influenced by cross-border processes and dynamics. The implications and effects become visible at different levels; the phenomenon of transnational biographies at the micro level, for instance, or the influence of international governmental and non-governmental organisations at the macro level. Also, the mobility of ideas (knowledge transfer) and people (migration, displacement, exchange) across national borders is indicative of developments that are increasingly relevant for educational practices and reforms as well as for education policy and debates on educational theory. These processes lead to globally changed conditions of socialisation and education in childhood, family, school, youth and adult life. Therefore, current education and training systems can no longer be captured by country- or culture-specific perspectives alone, but instead require analyses of their cross-border – geographical, sectoral and historical – linkages, entanglements and dynamics.

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Foreword

After being rejected for publication eleven times, Michael Dunlop Young succeeded in publishing what would become a classical reading on the topic of the present book. In *The Rise of Meritocracy, 1870–2033* (1958, London: Thames & Hudson), the British sociologist described a dystopian future in which talent and merit had become the sole criteria for advancement in and distribution of positions in society. Michael Young's intention in his utopian satire was to hold a mirror up to the face of a society divided by social classes and in which social origin cemented the privileges of the proprietary classes. For the author, Meritocracy was actually the problem because it perpetuated inequalities by deflecting attention from the factual issues of poverty and inequality of living conditions. Indeed, the distinction between *equality of opportunity* and *equality of conditions* is crucial in understanding the downside of such concepts such as talent, merit and equal opportunity. The first refers to the notion that individual advancement must not be limited by social origin, gender, or ethnicity, but rather be based solely on merit and talent; the latter denotes the tenet according to which wealth, power and status in society has to be held back to a minimum. To the author's consternation, the term he coined has taken on a highly positive connotation and Michael Young's worst fantasies seem to have materialized, at least if we consider nowadays' highly stratified higher education sector and its enduring inequalities in terms of access and outcomes across the globe. Andrea Cuenca Hernández's book presents a current, lucid examination at the issues involved by focusing a country aspirant of becoming less divided and more equal.

Colombia has shown a remarkable political, economic and social transformation during the past years. No other field testifies to this better than education, in particular secondary and higher education sectors. The dynamic expansion in higher education has been in large part due to its promise to upward social mobility both at individual and group levels, but also to contemporary globalized discourses about the necessities and benefits of becoming a knowledge-based society. However, the promises of higher education go well beyond social mobility and economic returns, indeed it bids fair to make equality of opportunities a reality. Thus, equal (higher) education access is linked to broader political participation, improved life chances and conditions, and not least to better labor market opportunities. While these social, political and economic aims are seen

as legitimate and desirable and thus garner broad political support, putting appropriate structures to achieve them into place and generating evidence of their effects is much harder.

Andrea Cuenca Hernández succeeds in bringing forward a thoughtful examination of mediating mechanisms that produce un/equal opportunities in higher education in Colombia. She diligently considers differences in outcomes and institutional features in her questioning of the compensating and exacerbating functions of the (higher) education system at three crucial transition points in the life course of young Colombians: completion of upper secondary education, pursuance of higher education, and entrance into the world of work. Her analyses focus not only the social determination of these results, but also the Colombian education system's own contribution to this phenomenon. Cuenca Hernández provides a very focused, well-argued, balanced and well-written analysis of a central theme of Latin American educational development. It bears importance for all those interested in the sociology of (higher) education, both in policy and practice.

Münster, October 2020 Marcelo Parreira do Amaral

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Acknowledgements

This book is a revised, updated version of my doctoral dissertation. It is also a tangible result of my desire to pursue a career in educational research, an early interest that emerged in the course of my undergraduate studies and was encouragingly nurtured by a small group of professors at the Psychology Department of the *Universidad Nacional de Colombia*. Sometime later, Ulrich Teichler and Barbara Kehm at the *Universität Kassel* opened the gate to the fascinating field of higher education research for me. Then during my doctoral studies at the Institute of Education Studies of the *Humboldt-Universität zu Berlin* (HU), I accomplished this goal, after learning many lessons in both my academic and personal life. I would like to express my most sincere gratitude to Rainer Lehmann for offering me the privilege and freedom to develop my own research ideas and kindly supporting me along the journey. As my main advisor, he has contributed his deep insight and dedication. At the institute, I am profoundly indebted to Marcelo Caruso, who generously agreed to guide my final steps in the successful completion of this process. I would also like to extend thanks to Hans Anand Pant who served on my doctoral degree committee.

Some scholars write in complete isolation, others do it surrounded by friends in cafés. My process combined these two methods. Although I completed substantial work in confinement, much of it emerged from motivating conversations at both formal and informal meetings. Over the years, my work has benefited from insightful comments from the participants in a variety of academic activities in Berlin, Bogotá and Santiago de Chile where I had the opportunity to present preliminary ideas and results. I cannot think of a better combination of places for carrying out this project and for meeting the 'right' people at the 'right' moment.

Berlin is where everything started in the midst of a very stimulating academic atmosphere. I not only had the opportunity to spend days and nights in the most incredible library halls, but I also attended numerous seminars, workshops, and conferences where experts in different fields were a source of knowledge and inspiration for my work. Special thanks are due to those scholars with whom I established closer contact at those events: Florencia Torche at Stanford University, Carlos Costa at *Universidade de São Paulo*, and Hans-Peter Blossfeld at *Otto-Friedrich-Universität Bamberg*. My most sincere gratitude to Patricio Solís at *El Colegio de México* for the valuable guidelines and constructive comments he provided for me when I participated in an interdisciplinary group he chaired

at “Inequality, Education and Social Power: Transregional Perspectives”, the Winter Academy held at the HU and the *Wissenschaftszentrum Berlin für Sozialforschung*. His work has been one of the most essential academic references for my research.

Bogotá is the place where I tested the relevance of my study through the lens of experts on educational research in Colombia. I would like to thank the Advisory Committee members from the Colombian Institute for Educational Evaluation (ICFES) for their valuable feedback and critical remarks, especially those from Darío Maldonado of the *Universidad de Los Andes*. I also profited from interesting comments and questions from participants of the 6th International Seminar on Educational Quality Research.

In Santiago de Chile, I found a rich academic environment in the fields of sociology of education and higher education research with a special focus on Latin America. I gratefully acknowledge Matias Bargsted, Andrea Canales, and Pamela Ayala for their thorough review of my work in the doctoral colloquium organized by the Institute of Sociology (ISUC) at *Pontificia Universidad Católica de Chile*. Their feedback and criticism led me to implement drastic revisions. From the Center for Research on Educational Policy and Practice, I am in debt to Andrés Bernasconi, who kindly invited me to join his enjoyable seminar and introduced me to the main scenarios in the growing field of higher education in Latin America.

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Part I Education and Inequality

1 Introduction

During my three-month doctoral research stay in Santiago de Chile, I had to take the subway line going south to get to the campus of one of the most-recognized higher education institutions in Latin America. I boarded at the downtown station where the combination of old and new buildings surrounded by crowds going different ways and speaking in their rapid, characteristic Spanish made me feel like I was in a very prosperous, cosmopolitan city. This perception of well-being and economic progress was complemented by the noticeable coexistence of social movements that represented and defended different vulnerable groups' rights and frequently protested at this central spot.

After several minutes of travelling in the subway network, I would arrive at San Joaquín station where the university's main campus is located. Although I did not understand the subtle social codes of Chilean society, I started noticing a pattern. When the subway doors opened each day, a marked division regularly appeared: those students who seemed to belong to the most advantaged social class – judging from some distinctive symbols – took the pedestrian bridge to the right heading straight for this private, selective university. In contrast, those apparently with a more disadvantaged origin turned to the left. San Joaquín and its surrounding neighborhoods are mainly made up of working-class households, a reality which is very far away from that of the students attending this first-tier university, who – for the most part – live in eastern Santiago. Many of those taking the left path were most likely heading for one of the second-tier higher education institutions located opposite to the large campus of this top university. The closeness of the two contrasting institutional types and the disparity of their respective students' characteristics caught my attention: it also provided a live picture of inequality in the Chilean higher education system, which is one of the most privatized worldwide.

A few months later, I joined a research team for a project on education at a university in Bogotá. Every semester, hundreds of young students begin their undergraduate studies at this institution, the most prestigious private university in Colombia. Some of these students come from the wealthiest families in the country, many of them were raised in major cities and have attended exclusive private schools. Becoming engineers, doctors, lawyers, professors or artists was always part of their plan. After four to five years, they are awarded a degree that allows them to find high-status job positions with high economic return. Some

of them might also pursue postgraduate studies in selective institutions either in the country or overseas.

In order to go to this university, right on the Eastern Hills in the city's downtown, I frequently used the *Transmilenio*, the massive public bus system for the city with a population of more than seven million. The bus station named *Universidades* is the end destination for many students going to any of the number of higher education institutions located in the area. At first glance, the social composition of those traveling by bus is widely diverse, which gave me a different picture compared to what I observed in Santiago. Yet, I perceived another pattern very soon. Upon leaving the station, the passengers from the overcrowded bus dissolved into groups going in different directions. Surprisingly, the number and frequency of students going up the street toward this elite university was always low. How could the more than 17,000 enrolled students at this institution arrive there if the bus system was not massively used by them? After some informal observations and conversations with students and colleagues, I found out that many of them drive cars as their main source of transportation. It is common to such an extent, that they have started a social media group where members can contact drivers for carpooling. These drivers are usually other students who travel from a certain point in the city – normally from their places in the North – to the university and back, and charge a slightly higher price than the bus ticket. It is indeed a very creative solution to the inefficient public transportation system. Although this pattern is not exclusive to this institution, it is considerably different from the choices, experiences, and institutional destinations of students from non-affluent households.

Stories like these make up the everyday scenario for many young adults in Latin America who try to get ahead through the equalizing promise of education. In a process of massification, higher education has become more accessible, allowing more individuals from disadvantaged backgrounds to enter this educational level. They are often the first ones in their family to do so, which makes them so-called 'first-generation college students'. In contexts like this, a central question arises: *Does higher education play an equalizing role?* This seemingly straightforward question is a recurring topic in public debate and widely discussed in academic research. Guided by this broad question, the present book contributes to the contemporary discussion on inequality of educational opportunities, particularly in settings with extreme, persistent levels of social inequality. It provides recent empirical data for Colombia, which is an interesting scenario worthy of study because it is an upper-middle income country with impressive economic growth and rapid educational expansion, but it is considered one

of the most unequal nations in both the specific region of Latin America and the world as a whole.

With a focus on individual trajectories across the life course, this study seeks to advance our understanding of the magnitude and the determinants of inequality of educational opportunities. By using a rich data set of administrative records for test scores, individual background and adult earnings, it examines the effects of social origin on academic and labor-market outcomes among those who had the opportunity to reach the highest rungs of the educational ladder. Findings will reveal some of the underlying mechanisms leading to the aforementioned situations in an extremely unequal society with a stratified education system.

This introductory chapter presents the unequal opportunity problem and situates this research in the particular context of Colombia.

1.1 The Unequal Opportunity Problem

Several scholars have documented the existence of differences of well-being among members of modern societies, thus producing social inequality. There is a contemporaneous concern about inequality, due to its importance in the establishment of stratified social systems (Grusky, 1994), but also because it is transmitted from one generation to another over time (Neckerman & Torche, 2007). Although research on social inequality has largely focused on disparities in income and wealth, other forms of inequality may also be important to consider as they affect individuals' outcomes in social and political domains, such as health, crime, education, and politics. Education is one of the most crucial of these domains. On one hand, "educational achievement is a dimension of well-being in its own right", and on the other hand, "educational inequalities may translate into undesired gaps in other dimensions", for instance earnings, but also health status or political participation in democratic processes (Gignoux, 2014, p. 1).

The dispersion or concentration of the quantity and quality of education received by individuals has been the object of study of a large body of literature from different disciplines. Economists, philosophers, sociologists, and educational researchers in general have documented the presence of educational inequalities, based on diverse theoretical perspectives and at various levels of analysis. Here, the work is theoretically grounded in the sociology of education, which has enormously contributed to the development of an equality-related analysis in education on account of its "capacity to be a critical and generative force" (Lynch, 2006, p. 86). A broadly accepted thesis in sociology of education since

the 1960s is the existence of *inequality of educational opportunities* (hereinafter IEO).

The study of the inequality of *opportunities*, in contrast to that focused on the inequality of *conditions* or *outcomes* in the research area of social inequality (Boudon, 1974; Breen & Jonsson, 2005), allows researchers to formulate questions that shed light on explanations that go beyond descriptions. While the latter type of study seeks to measure the dispersion in the distribution of goods or resources among social groups, the former type is concerned with whether or not certain individuals have the possibility to obtain such goods or resources and why. Regarding the topic of education, a common measure of IEO is the intergenerational association of families' socioeconomic standings with the children's educational outcomes, that is, the extent to which differences at one point in time affect results in the next generation. When this association is weak or nonexistent, there is equality of opportunities or, in other terms, social mobility. On the contrary, there is IEO when the *ascribed* characteristics of individuals (i.e., those attributes that they are given at birth and are beyond their control, including social origin, gender, race or ethnic background) determine their access to educational resources and their subsequent attainment and achievement.

This book contributes to the current debate about equalization of opportunities through education. It provides original, empirical evidence on IEO in Colombia, one of the most unequal nations in Latin America which has also held the dubious distinction of being the most unequal region of the world for decades (Alvaredo & Gasparini, 2015). In particular, the main objective is identifying the extent of IEO associated with *social origin* – that is the social position of the family household – among the population of bachelor's degree holders. Special focus lies in the understanding of the underlying mechanisms that might produce IEO in this setting of social inequality, which has nonetheless experienced a rapid rise in educational enrollment. Advancing in this direction will help establish whether and how the education system has the capacity to influence individuals' life opportunities.

1.2 Disparities in Education: from Quantity to Quality

The widespread idea that fostering education in modern societies has positive effects on individual earnings, income distribution, and a country's economic growth has a long history, predominantly in economics literature (e.g., Becker, 1964; Mincer, 1974). Recent evidence indicates that this association occurs not

only in terms of educational *quantity* (i.e., number of schooling years or educational levels completed) but also, and to a greater extent, in terms of educational *quality* (Hanushek & Wößmann, 2007). Among the various measures of educational quality, outcome indicators are commonly used, in particular student achievement, which is seen as the most direct outcome of schooling and often measured by means of academic test results (Scheerens, Luyten, & van Ravens, 2011). With the extended use of international large-scale assessment studies (e.g., OECD's Program of International Student Assessment PISA), individual achievement has become essential to the ideal of equal educational opportunities, to such an extent that it nowadays dominates educational reform debates and policy agendas worldwide (OECD, 2004).

Despite the progressive expansion of the Colombian education system in recent decades (quantity), especially at the levels of primary and lower secondary education, there are still big challenges related to learning outcomes (quality). In other words, advances in enrollment do not seem to be accompanied by a qualitative leap in academic performance among Colombian students. Regarding this point, two main problems can be identified: learning outcomes are not only poor but also unequally distributed (Barrera, Maldonado, & Rodríguez, 2012; García, Maldonado, & Rodríguez, 2014; OECD, 2016a).

Concerning the first problem, with the participation in standardized testing in education, Colombia has acknowledged that on average the national performance in basic foundational skills (e.g., numeracy and literacy) is very low compared to both developed nations and other emerging economies in Latin America. Indeed, the learning outcomes have been found to be so low that reports from supranational agencies (e.g., OECD, 2013) have indiscriminately asserted that drawbacks in educational quality are slowing down the development of human capital and, therefore, the economy's productivity.

However, considering national education systems merely in terms of the country's economic progress is too narrow. The mission of education has evolved over time according to changes in economic and political context, so that it currently plays a key role in ensuring that all learners acquire the skills necessary to be productive in the workforce and also to participate actively as citizens in democratic societies (Allen, 2016). Therefore, besides promoting basic competencies in key domains like mathematics, reading, and science, the function of education to develop both citizenship and socio-emotional competencies also constitutes a fundamental issue for the construction of democratic regimes. This purpose is certainly crucial considering Colombia's current historical situation which includes the implementation of a peace process after almost sixty years of internal

armed conflict. In the midst of critical social, economic, and political transformations in the country, guaranteeing that all students develop basic, civic, and socio-emotional skills during primary and secondary education is a pivotal condition for the country's future. More importantly, these skills are also crucial in helping individuals construct their life projects, make decisions, live in a community, be tolerant, take part in the political sphere, and defend human rights.

As for the second problem, results from both international and national tests have found enormous inequalities in the distribution of learning outcomes. Even though the Colombian population's enrollment is constantly on the rise at all levels of education, inequalities of educational outcomes among social groups still persist. National studies on educational inequalities have consistently found that individual outcomes, both in achievement and attainment, are greatly unequally distributed according to socioeconomic conditions, ethnicity, race or gender. Disadvantaged groups in the country, particularly individuals with low socioeconomic background, but also those living in rural and peripheral regions, and with African or indigenous origins, are more likely to have less schooling years, get lower test scores and follow truncated educational pathways in contrast to their more advantaged counterparts.

Although a country's high average student performance does not automatically imply equal distribution of outcomes among the population – nor vice versa – the international evidence from PISA shows that the majority of high-performing nations also exhibit modest levels of between-school variance (OECD, 2004). This suggests that high average quality can go together with a high degree of equality of educational outcomes. Therefore, ensuring equality in the distribution of learning opportunities – particularly by securing low levels of variance in performance among both students and schools – is not only imperative but also compatible with the goal of reaching high overall learning standards.

Research on educational stratification in the country has tended to be based on the perspective of inequality of *outcomes* rather than that of *opportunities*. In their attempt to estimate the magnitude of the socioeconomic gap in educational achievement or attainment, national studies often fail to explain how these inequalities occur. In contrast, the empirical exercise conducted here puts special emphasis on the *mechanisms* that underlie individuals' unequal outcomes, i.e., whether and to what extent certain characteristics of social origin determine people's outcomes on their path through the education system and the world of work. In doing so, it advances the understanding of IEO associated with social origin in Colombia.

Further, a focus is put on the existence of IEO among those who have already completed secondary education, gained access to higher education, and graduated from a bachelor's program. Therefore, the educational and occupational trajectories analyzed are those of a very select group of individuals, who have previously passed various educational transitions. In particular, it examines two types of outcomes across their educational and occupational trajectories. The first type is individual *academic achievement*, traditionally measured through their performance on standardized tests. Additionally, information on academic achievement of the same individual at both secondary and higher education levels is incorporated, which is seldom done in the international literature. In fact, there is a lack of large-scale assessments of learning outcomes at higher levels of education. The second type relates to individual *labor-market outcomes*, measured by means of income level after university graduation.

Although social origin remains one of the most powerful factors influencing individual outcomes, the characteristics of educational institutions and systems also play a fundamental role. Several studies from different empirical traditions have addressed the consequences of the structure and institutional features of education systems on both short- and long-term outcomes of individuals' educational and occupational careers. Accordingly, an element of inquiry included here revolves around expressing educational inequalities in terms of qualitative or *horizontal* inequalities (Lucas, 2001), since all members of the target population have reached the same level of educational qualifications. Contrary to the quantitative or *vertical* inequalities (i.e., attainment), horizontal inequalities point at the way individuals' opportunities may be influenced or mediated by institutional differentiation at the same level of education.

Formal features related to educational institutions, such as curriculum orientation, tracking or school resources, have been found to systematically affect individuals' performance and, therefore, the extent to which education systems give or fail to give equal opportunities to all. Differentiation of educational institutions may be also due to *informal* dimensions (Teichler, 2004, p. 4) or 'hidden' characteristics which are not officially specified by the education system but are associated with diverse degrees of quality or reputation in educational provision. Both formal and informal differentiation may contribute to the intergenerational reproduction of social inequalities as it may have an effect on individual outcomes. In this regard, a recent group of studies in developed nations (Blossfeld, Buchholz, Skopek, & Triventi, 2016) have shown that educational reforms in secondary education may worsen educational inequalities if formal differentiation is replaced by informal differentiation. Similarly, some studies in Latin

America (Blanco, Solís, & Robles, 2014) have found that the interaction between the initial social conditions and the institutional segmentation simultaneously affects the course of individuals' educational and occupational trajectories.

In a hierarchically-differentiated education system like Colombia's the extent and rationales of horizontal inequality constitute a relevant matter of research. In the case of secondary education, horizontal inequalities refer to the different types of schools, for example, factors like curriculum orientation, school day, and sector. As for higher education, access has grown dramatically during the last decades in Colombia, creating an increase of students from disadvantaged socioeconomic backgrounds who are the first generation in their families to reach this level. However, this process has at the same time been mitigated by a hierarchically-differentiated higher education provision, composed of a few private elite universities, a growing number of 'lower-tier' professional-oriented private institutions, and highly-selective, yet pauperized, public research universities. As a result, the new, less-selective institutions have absorbed the rise in enrollment, particularly of students from underprivileged social origins.

In general, but especially within the national context, less attention has been paid to the intergenerational socioeconomic association among individuals with the same level of schooling (Bernardi & Ballarino, 2016). The gap is bridged here by analyzing the association between social origin and the degree of success in educational and occupational outcomes obtained by the highly educated. Even though they share the same level of university credentials, they have attended diverse types of programs and institutions, which in turn might shape their subsequent outcomes. This means that the educational inequalities examined are those displayed in the form of qualitatively different paths according to the types of secondary schools and higher education institutions attended. The analysis is also centered on how social origin influences individuals' outcomes, conditional on the type of institution. If students from different social origin attend different types of secondary schools and universities, thus being exposed to qualitatively different learning environments, this in turn is likely to have a substantial effect on their subsequent educational and occupational trajectories. In other words, the study addresses the question of to what extent horizontal inequality is expressed in the stratification of the educational destinations of those who achieve a university degree. And if so, whether or not horizontal inequality has an impact on both academic achievement and occupational attainment of higher education graduates. Findings of this study are expected to shed new light on the role played by the national education system: if it is reproducing or compensating social inequalities of origin even among the highly educated.

1.3 This Research: Social Origin, Education, and Labor Market

At the center of the aforementioned research problem lies the question: *To what extent and through which mechanisms does social origin have an impact on educational and occupational outcomes among Colombian higher education graduates?* By analyzing whether social origin determines the educational and occupational trajectories of the highly-educated population, this study seeks to disentangle the mechanisms whereby social origin-based forms of inequality are either reproduced or overcome throughout the successive transitions within the particular context of the Colombian national education system. Answering this broader question requires an empirical analysis addressing the following specific questions:

(1) To what extent and through which mechanisms does social origin determine the *type of institution* attended at both upper secondary and higher education levels?
(2) To what extent and through which mechanisms does social origin determine the *academic achievement* of individuals during both upper secondary education and a bachelor's degree program? How does the type of institution mediate the relationship between social origin and educational achievement?
(3) To what extent and through which mechanisms does social origin determine the graduates' *income*? How does educational achievement and type of institution mediate the relationship between these factors?
(4) From a general point of view, does the Colombian higher education system contribute to equalizing opportunities among individuals or does it reinforce the inequalities associated with social origin?

Each query points at a certain relationship between key factors. The first question examines the association between social origin and the educational decisions taken on by students and their families concerning selecting the type of secondary school and higher education institution to attend, in terms of formal and informal dimensions related to quality issues. The second questions focus on social origin and its connection to students' academic achievements in the national standardized tests at the end of secondary school (SABER 11 test) and in the last year of university studies (SABER PRO test), after controlling for type of institution type at both educational levels. The third set of questions looks at the relationship between social origin and outcomes in the labor market – particularly

income – and the mediation of educational variables (i.e., academic achievement and type of institution attended) in this relationship.

Beyond the influence of social conditions of origin on educational and occupational outcomes (questions 1, 2, 3), the extent to which national education systems contribute to overcoming the achievement gap among individuals from different social origins has also been a research focus for those interested in IEO (question 4). Thus, the final question is broader and oriented to discuss the role of the Colombian education system as a whole: Could it be that, in a country characterized by tremendous educational expansion over recent decades, the long-lasting effect of social origin persists among those who graduated from a first-degree university program? In a more general way: Is the expansion of the education system in Colombia compensating for educational inequalities associated with students' social origin?

By engaging with these questions this book intends to make valuable theoretical and empirical contributions to the study of educational inequalities. First, it provides empirical evidence of the extent and patterns of IEO in a non-industrialized, highly-unequal nation, which could nurture the current debate in the already voluminous literature in developed countries. Second, it proposes a comprehensive approach including the discussion of theoretical assumptions from different research traditions that often disjointedly tackle the phenomenon of educational inequalities. Whereas achievement studies have mainly concentrated on primary and secondary education, intergenerational mobility research often deals with the level of higher education. Also, while the former do not consider occupational outcomes of individuals, the latter is not particularly concerned about their academic performance. The innovation here is the integration of these two empirical research traditions in sociology of education. The discussion also incorporates relevant developments in the research tradition of educational effectiveness and some topics from the field of higher education research.

Third, shedding light on how social origin may have an impact on educational and occupational outcomes through either family socioeconomic conditions or parental education increases our understanding of the determinants of IEO in the Colombian context. Fourth, the analysis of this determination is conducted across individual trajectories, including data on achievement at both secondary and higher education levels, combined with information about labor outcomes. The inclusion of diverse individual results at different points in time contrasts with the tendency to analyze a single dependent variable. Finally, the influence of social origin on outcomes among persons with the same level of education has been less studied. Focused on the population of higher education graduates, this work

assesses the existence of horizontal inequalities, which may be expressed in the specific institutional arrangements and mechanisms, that is, the structure of education systems and policy interventions. Although the empirical analysis is not free from limitations, the work presented here paves the way for further research in the national context.

1.4 Structure of the Book

The book is divided into four parts containing a total of nine chapters. **Part I** includes this introductory chapter. **Part II** provides an overriding foundation for both empirical and theoretical discussions on IEO associated with social origin. For the sake of brevity, a book of this nature must be highly selective and, therefore, does not include many important theoretical and empirical contributions. Approaches focused on individual-centered explanations of academic performance, teaching and learning processes within classrooms, and organizational aspects of schools are out the scope of the present investigation. Other important research lines, such as the neo-institutional theories in education or the intersectional, critical, feminist, postmodern perspectives on education are also left out from this review. This part is divided into three chapters.

Chapter 2 starts with a definition of the core concept of IEO, mentions some operationalization issues, and introduces the O-E-D triangle as the pivotal analytical scheme on which this book is based. This model serves as a basis for introducing different research traditions on educational inequalities. At the end of the chapter, I discuss some variable-related aspects to consider when analyzing disparities of educational outcomes.

Chapter 3 brings together four empirical research traditions: (1) sociological studies on inequality of educational opportunities; (2) educational effectiveness research; (3) intergenerational mobility research; and (4) higher education research on expansion and stratification. It discusses how these research traditions, from different disciplinary foundations and diverse objects and levels of analysis, have directly or indirectly approached the phenomenon of IEO. I also examine the main conceptual and methodological aspects, and the most salient research findings of each tradition.

Chapter 4 presents a general outline of the main theoretical perspectives on the underlying mechanisms and trends of IEO. In particular, it deals with the theoretical approaches concerning the mechanisms generating inequalities in academic achievement and in educational choices. It also includes a debate between

two views of the trends in the association between origin and destination: equalization of opportunities versus persistence of inequalities. Even though my posed research problem does not aim to contrast different theorizations of educational inequality, I do build a comprehensive conceptual framework as a basis for interpreting the results obtained in the study conducted in the next part of the book.

Part III comprises chapters 5 to 8, which are devoted to the empirical exercise of the study of IEO in the Colombian case. **Chapter 5** introduces the reader to the contextual framework for analyzing education in Colombia. It begins with a description of the national education system along with an overview of some general demographic and economic figures centered on the magnitude of social inequalities in the country. Then it describes the main trends in educational access, achievement, and inequality of outcomes at both the secondary and higher education levels. A special focus of the description is on the institutional arrangements of the national education system, such as institutional diversification, particularly at the level of higher education.

Chapter 6 starts with a review of the most representative studies conducted in the national context, by taking into account the classification of research traditions described in Part II. It briefly discusses the main findings and current state of knowledge regarding educational inequalities in Colombia then concludes by presenting the contributions of this book to minimizing the existing holes in the international and national literature, and picks up the orienting questions in the light of the theoretical and empirical review of previous chapters.

Chapter 7 turns to the data sources and methods used in this study, and also deals with the measure and construction of variables. As there is no longitudinal data in Colombia, a construction of the educational and occupational trajectories of university graduates is provided by integrating three high-quality national administrative databases. The data set designed specifically for this study allows for an apprehension of three crucial transition points in the individual's life course, where educational and occupational decisions take place: completion of upper secondary education, the pursuit of university studies, and the transition into the world of work. With this data set, it was possible to carry out empirical analyses to answer the initial research questions.

Chapter 8 presents the results obtained using path analysis with multiple ordinary least squares (OLS) linear regression models. Specific results for each model of educational and income outcomes are discussed in detail, taking into consideration the evidence found in the national context.

Part IV concludes with **Chapter 9**, which draws together the findings of the empirical study in the light of the theoretical implications and related research

on IEO previously discussed. It summarizes the main results and provides a general discussion of their relevance. It also identifies the contributions of this study to the empirical research on IEO in general, and in the Colombian context in particular. Building upon this, some policy implications are envisioned. Lastly, the main shortcomings are identified and some proposals for model extensions and further developments are suggested.

Part II The Study of Educational Inequalities: Empirical and Theoretical Perspectives

2 Inequality of Educational Opportunities

To begin, the core concept of this book, *inequality of educational opportunities*, is introduced by providing a definition of it in the framework of social stratification research. Then the discussion shifts to the analytical model used in the research area on intergenerational mobility: the *Origin – Education – Destination (O-E-D) Triangle*. Based on this scheme, the chapter presents four research traditions that have approached the empirical study of educational inequalities from different conceptual and methodological perspectives. Finally, the last section considers some aspects regarding variables in the analysis of inequalities of different educational outcomes.

2.1 Equity, Equality, and Opportunity

Although the concepts of *equity* and *equality* are commonly used in education, there is a great variability in the definitions and interpretations of them. They are frequently viewed as synonymous and are being increasingly applied in the educational practice, research, and policy agenda. Similarly, the concept of *equality of opportunities* in general, and in education in particular, is a widely accepted normative principle in modern societies (Torche & Wormald, 2004) and an issue of political discourse, which is often interpreted ideologically (Müller & Pollak, 2015). However, there is no consensus about its meaning (Jencks & Tach, 2006) nor its operationalization (De Ferranti et al., 2003).

The origin and use of the concepts *equity* and *equality* can be traced back to the framework of distributive justice of conditions and goods among individuals affecting their wellbeing.[1] These concepts have been widely investigated in disciplines such as political philosophy and ethics – with John Rawls (1971) being the pioneer of the ideas of distributive justice. Further, in economics, they have been covered, with particular emphasis on the area related to welfare, by Keynes, Pareto, Arrow, and Sen, among others. Overall, the difference between both terms can be understood on the basis of the two Aristotle principles, namely, 'equality' and 'fairness'. Whereas equality refers to a similar treatment to all persons, equity is related to fairness or justice. According to this, the difference lies in the fact that whereas the former conception involves an objective assessment,

1 For a discussion on the meanings of these concepts and their implications to justice and educational policy, see for example, Burbules, Lord, and Sherman (1982).

the latter also entails a subjective moral or ethical judgment (Bronfenbrenner, 1973). In this sense, equality in the distribution of income or wealth can, for example, be assessed quantitatively. However, equity assessments are more problematic because people often have different meanings of fairness and justice, and because they may lack the necessary and sufficient information or knowledge to establish causal-effect relationships related to equity (Espinoza, 2007). Beyond these differences, from a long-standing perspective, theorists of social justice argue that equity and fairness are more properly defined in terms of *opportunities* than outcomes, since the latter also depend on individual's features, such as age, gender, social origin, etc. (De Ferranti et al., 2003).

Opportunities are not equivalent to choices nor likelihood, but to the chance to do or to get access to something. This differential access to opportunities is related to the concept of *Lebenschancen* (translated life chances) in the work of Max Weber (1964). For Weber, the term *Lebensstil* (lifestyle) comprises two basic components: *Lebensführung* (life conduct) and *Lebenschancen* (life chances), where the former refers to the choices people have in the selection of their lifestyles and the latter means the likelihood of realizing those choices. The author then identifies an interplay between choices and chances, and points out that the chance to make some choices is anchored in structural conditions (e.g., income, norms, rights, etc.) (Abel & Cockerham, 1993). Likewise, in one of his well-known works, Amartya Sen (1987) distinguishes between 'achievement' and the 'freedom to achieve', as two key elements for the assessment of the magnitude of inequalities and their normative significance. In my view, Sen's conception of individual's potential achievements (i.e., freedom to achieve) is equivalent to the Weberian idea of 'chance to make some choices', and both denote the very meaning of opportunity.

Historically, the idea of equality of educational opportunities had no relevance in pre-industrial societies. Indeed, the concept hardly arose in Europe and North America with the Industrial Revolution in the early 19th century (Coleman, 1967). But since the second half of the 20th century in industrialized nations, and some decades later in the developing world, this idea gained strength in the midst of an improved access for the lower levels of education and progressively in the higher levels. As national education systems grew, they transformed themselves to be organized around the normative ideal of equality of educational opportunities (Dubet, 2006), according to which all children and young persons should have equal rights in access to education.[2]

2 The ideal of equality of educational opportunities has been called into question by some authors, though. For example, Dubet (2011) criticizes the apparent existence

Drawing on the theoretical foundations of sociology, this book uses the key concept of *inequality of educational opportunities* (IEO) as it is defined in the social stratification research. The stratification system in a society refers to the complex of social institutions that generate social inequalities (Grusky, 1994), allocating individuals, households or groups into positions ordered hierarchically according to the unequal distribution of certain type of assets, resources, and valued goods (e.g., power, privilege, material or symbolic means). The movement in time of social units between different positions within this system is known as *social mobility* (Müller & Pollak, 2015). Studies on social mobility are focused on the individuals' chances of access to or movement between positions, and distinguish between *intra*generational and *inter*generational mobility. Whereas intragenerational – or career – mobility compares the movement between individuals' own positions over time, intergenerational mobility compares individuals' positions in adult life with their families' positions. Traditionally, the family has been regarded as the key unit of social stratification among sociological theories of social inequality, whether influenced by Durkheim, Marx or Weber (Blossfeld, 2007).

My focus here is on intergenerational mobility, which is an important sociological concept as it provides a measure of inequality of opportunity (Torche, 2015). In studies on intergenerational mobility, there is a classic distinction between *inequality of outcomes* or *conditions* and *inequality of opportunities*. The former refers to the dispersion in the distribution of a particular group of goods or resources (e.g., economic wellbeing, income, education or health) among social groups at one point in time, (i.e., the conventional concept of *social inequality*). In a different way, inequality of opportunities related to *social origin* – that is, the conditions of life in the parental family (Müller, 2001) – concerns the possibility for individuals to obtain such goods or resources across generations (i.e., *intergenerational social mobility*). There is *inequality of opportunities* when the ascriptive characteristics of individuals (e.g., gender, race or family background) determine their access of resources (Boudon, 1974; Breen & Jonsson, 2005). This implies the intergenerational association of family conditions at the

of 'fair schooling' (*une école juste*) as a vague slogan, yet effective in mobilizing public opinion. For a critical analysis of the meritocratic conception of fairness in the French education system, see Dubet and Duru-Bellat (2007).

origin and the outcomes achieved by their children over the life course. Conversely, there is *equality of opportunities* when the relationship between individual's ascribed factors and outcomes is either weak or nonexistent.[3]

Studying the problem of IEO implies approaching the phenomenon from a fundamentally empirical perspective: the association between individual's ascriptive characteristics and his or her educational outcomes. Nevertheless, in the empirical research on educational inequality, most attention has been paid to inequality of conditions than to that of opportunities. Numerous studies and reports in education have measured the differences in the dispersion of educational outcomes (e.g., achievement or attainment), either in terms of univariate distributions or in terms of differences between social groups (e.g., by socioeconomic conditions or gender). This makes it possible to obtain global measures of distributive inequality (e.g., the Gini index), but does not contribute to understand how inequality is transmitted over time and across generations (Solís, 2012). Nevertheless, the association between ascribed features and educational outcomes or IEO has been analyzed in a lesser extent. Inequality of opportunity does not refer to the dispersion in a distribution, but rather highlights the differences between social groups in the position that individuals take within that distribution. Statistically speaking, IEO implies a bivariate (or multivariate) association between social groups and educational outcomes (van de Werfhorst, 2014).

2.2 The O-E-D Triangle

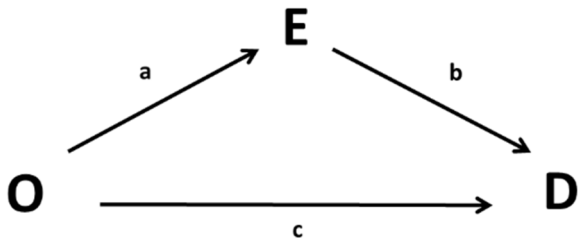
As IEO is a concept used quite loosely, often linked to different needs and interests (Sørensen, 2006), there is no agreement on how to measure it. Having a common measure of educational inequalities is not only key for the research development on its magnitude and trends over time and across countries, but also for policy purposes in the design, development, and evaluation of interventions.

3 In the framework of economics, John Roemer (1998) proposes the distinction between 'circumstances' and 'efforts', which is similar to the ascription-achievement dichotomy introduced by sociologist Talcott Parsons (1951) in his theory of social action three decades before. While circumstances are equivalent to ascribed features, efforts refer to those factors over which individuals have a measure of control, as for example the time or intensity one put in carrying out a task. Thus, a situation of equality of opportunity occurs when individual outcomes, such as income, are distributed independently of circumstances.

In both economics and sociology, different methods have been proposed for the operationalization of inequality of opportunities.[4] In the applied economic literature, most methods measure this phenomenon based on a translation of Roemer's ideas.[5] This book adopts a model used in the sociological empirical research on intergenerational mobility, in which inequality of opportunities is assessed in terms of the association between social origin variables and individual's outcomes, or between *origin* and *destination*. This model is known as the Origin-Education-Destination triangle.

The O-E-D triangle represented in Figure 1 is the simplest model of the mobility process (Breen & Luijkx, 2004a). Overall, this model captures the main paths that link individuals' conditions of origin and their destination in later life course stages, or in other words, the association between the parental family's position and the position that individuals eventually achieve over the life course (Pollak, Otte, Scherer, & Gangl, 2007). Since the mediating effect of education on the pathway from origin to destination is well-established (Blau & Duncan, 1967; Ishida, Muller, & Ridge, 1995), it is frequently included as an intermediate variable between the intergenerational association.

Figure 1: Relationships between origin, education, and destination



Sources: Breen (1998); Breen and Luijkx (2004a).

Studies of intergenerational mobility capture socioeconomic standing at the origin (i.e., family conditions) and at the destination (i.e., individual's current or

4 For a review of the conceptual and methodological contributions from both disciplines to the study of social mobility, see Morgan (2006).

5 For instance, drawing on the Roemer's work, Ferreira and Meléndez (2014) developed the Opportunity Level Index to analyze the phenomenon in Colombia. Also, Bourguignon, Ferreira, and Menéndez (2007) proposed a measure for earnings inequality in Brazil, and Ferreira and Gignoux (2011) and Gamboa and Waltenberg (2015) have applied this approach to PISA data for a measure of IEO in cross-country comparisons.

final conditions). Typically, scholars explore different concepts of social mobility, by using different measures of social origin and destination, such as: family income or wealth, individual earnings, social class, occupational status or prestige, parental education, or other measures of socioeconomic wellbeing (e.g., housing conditions, poverty index, etc.).

In contrast to economists who traditionally emphasize income and earnings, sociologists focus on other dimensions of socioeconomic standing. The two most common measures of social origin within sociological scholarship are individuals' occupations (i.e., individual positions in the social structure determined by relations of production in the labor market) either in the form of social class or socioeconomic status. Some sociologists also identify a third measure consisting of occupational prestige scales (e.g., Ganzeboom & Treiman, 2003). Even though continuous measures of income make possible to use a wide range of statistical techniques, supporters of the sociological measures argue that occupational status/social class are better and more stable measures of socioeconomic conditions as they are a 'good proxy' for lifetime income (Mayer, 2017). Beyond disciplinary debates, recent academic and policy discussions have starting to consider combined information of both occupations and wages (Morgan, 2006). Yet, the debate of how best to conceive and measure origin and destination exceeds the purpose of this section, as it is "an industry in itself" (Breen & Jonsson, 2005, p. 225).

Studies in this line have also considered other independent variables, such as gender or ethnicity, which have not received the same attention even though they typically are intertwined with social background variables.[6] Ethnicity has been of special interest in some developed nations to assess the existence of inequality of opportunities among first, second, and third generation migrants. Ethnicity as well as race also constitute crucial attributes of social origin in countries characterized by multicultural settings and a socio-historical process of racial mixture, as is the case of Latin American nations.

In particular, this work addresses the phenomenon of IEO associated with *social origin* in the group of higher education graduates, that is, whether their household's socioeconomic standing determine their educational and occupa-

6 As highlighted by the intersectionality perspective in the framework of gender studies. It adopts a multicausal approach for understanding inequalities by intersecting the impact of multiple variables, such as gender, race, class, ethnicity, sexuality, disability, etc. (McCall, 2001). Despite its relevance in making the multidimensional character of social inequalities visible, scholars on IEO seldom incorporate different independent variables in the form of statistical interactions.

tional outcomes. In spite of the importance of characteristics such as race or ethnicity in the multicultural context of Colombia, they are not the focus of this study. Furthermore, although gender is also an important marker of advantage, particularly in the labor market, it is not at the core of the discussion held in this work and will be just treated as a control variable. The limitations of not including these ascribed features in the analysis of IEO need to be taken into consideration when interpreting the findings.

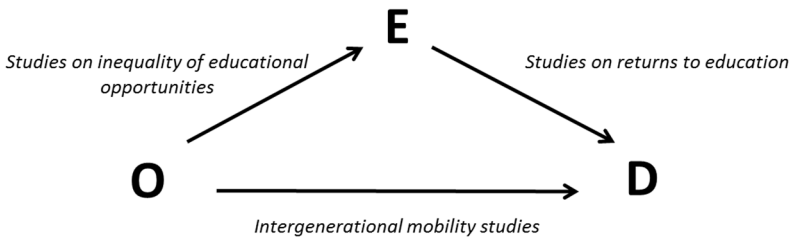
2.3 Relationships between Origin, Education, and Destination

The O-E-D triangle allows the analysis of individuals' trajectories through three main relationships, as illustrated in Figure 1:

(a) The link between social origin and individuals' educational outcomes (O-E).
(b) The association between education and occupational attainment (E-D).
(c) The direct linkage between position of origin and occupational destination (O-D), and the indirect association between the two through education as an intermediate variable (O-E-D).

Each one of these relationships constitutes the object of study for different research traditions within the area of social stratification research (Bernardi & Ballarino, 2016), as shown in Figure 2.

Figure 2: Types of studies on the relationships between origin, education, and destination



Source: Own elaboration.

The association between social origin and individuals' educational outcomes (O-E) – in terms of either attainment or achievement – has been the focus of studies on *inequality of educational opportunities IEO* (Bernardi & Ballarino, 2016; Breen & Jonsson, 2005). It also has given rise to a productive empirical research tradition centered on academic achievement, namely the *educational effectiveness research*, known in Latin America as *research on factors associated with learning*. Academic or educational achievement refers to the competencies acquired (i.e., what people know or can do with their knowledge) through the different educational levels and programs offered by national education systems.

The E-D relationship, that is, the effect of educational variables on income, has been widely examined by *studies on returns to schooling*, mostly at the higher levels of education. The literature that links schooling with productivity at both individual and societal levels has a long history, especially among economists (e.g., Becker, Mincer). In general terms, there is a solid consensus on the strong effects of educational attainment – and more recently of educational achievement – on occupational destination in modern societies: higher educational credentials lead to higher income and occupational prestige, as well as lower unemployment risk. Nevertheless, such a consensus does not exist on the mechanisms that link education and labor market outcomes.

The overall O-D association has been analyzed by the *intergenerational mobility studies.* Social origin influences individual's destination both directly and indirectly through its impact on education (O-E-D). The O-D link indicates the residual direct effect from origin to destination that is not mediated through other variables. By disaggregating the linkage between origin and destination into different components, education seems to play a key role. This tradition was initiated by the seminal work of sociologists Blau and Duncan (1967), who assessed the extent to which the influence of social origin on destination is mediated through educational attainment, as the central mechanism of intergenerational transmission of advantage. In this type of studies, educational attainment is typically measured in two ways: by number of years in the school system or by the highest educational level completed.

The orienting research questions of this study address two relationships of the triangle in which social origin is the independent variable: O-E-D and O-E. The E-D association is not, therefore, the primary focus here.

2.4 Four Research Traditions

This section presents a set of four research traditions that are relevant for the present research. Although these research traditions come from different disciplines, they all share a common interest in educational inequalities, even though they have been developed beyond that concern. Table 1 lists the traditions and summarizes their main object of study. The first tradition exclusively focuses on the study of IEO from the sociology of education perspective. Second, the educational effectiveness research tradition, which has been for the most part developed by economists of education, is interested on those institutional factors affecting educational results. Third, the study of intergenerational mobility within the sociological research on stratification, whose particular emphasis is on the impact of ascribed factors on occupational outcomes. Finally, the fourth tradition belongs to the interdisciplinary field of higher education research. Although all four-selected traditions rely on empirical data, each one exhibits different degrees of development as well as different levels of analysis and abstraction in the theoretical component.

Table 1: Four research traditions linked to the study of educational inequalities

Research tradition	Main object of study
(1) Sociological studies on IEO	Association of ascribed factors and individuals' educational outcomes.
(2) Educational effectiveness research	Institutional (school) factors associated with individuals' educational outcomes.
(3) Intergenerational mobility studies	Association of ascribed factors and individuals' occupational outcomes.
(4) Higher education research on expansion and stratification	Macro-structural factors of higher education systems associated with individuals' educational outcomes.

Source: Own elaboration.

Examining the vast literature on educational inequality would be a major undertaking that exceeds the limits of this book. Therefore, other important lines of sociological research related to IEO are left out from the present review, such as: the analysis of institutional effects of education as a legitimation system (e.g., Meyer, 1977); the organizational aspects of schools; the teaching and learning processes within classrooms; or the perspectives from critical, feminist, post-

structuralist, and postmodern theorists.[7] The limitations of not including these traditions are acknowledged. A more detailed description of these traditions will be given in Chapter 3.

2.5 Analyzing Inequalities in Different Educational Outcomes

Adopting the O-E-D triangle in the study of educational inequalities requires to take into consideration some issues, especially regarding the variables under study. A first analytical step concerns what variables of origin to consider. In social mobility research, social origin variables are related to certain household and families' characteristics, which usually are measured through the parental economic and educational background. Since the different measures assessing social origin relate to different mechanisms (e.g., income, social class, occupational prestige or status, parent's education, or specific measures of disadvantage such as poverty indicators), studies on IEO should be clear as to how social origin is operationalized, and why these particular dimensions have been chosen (van de Werfhorst, 2014). Variables of 'origin' refer to ascriptive factors and could also include birthplace, gender, race or ethnicity,[8] which have been studied to a lesser extent, as the majority of analysis from this perspective have an emphasis on socioeconomic conditions (e.g., income, socioeconomic status or social class).

Regarding educational outcomes, either as final or mediating variables, different measures may be of interest. In stratification studies, the most common measure is educational attainment. One could investigate, however, a number of different education outcomes and indicators (Lucas & Beresford, 2010). As education is a long-term process, in which individuals are sorted at different transitions points along their trajectories, educational inequality can be considered with regard to the failure or success in terms of educational outcomes. With respect to educational outcomes that are susceptible of being measured in the study of IEO across different stages of the educational process, a simplified list is given in Table 2: *access, achievement, attainment, choice,* and *labor outcomes*. While

7 A review of these lines of research is in Lynch (2006).

8 For a critical view on the conceptualization and measurement of various sociodemographic variables in the study of IEO, including class, race, and gender, see Lucas and Beresford (2010).

the first four types of outcomes refer to dimensions of the education system itself,[9] the last one refers to the link between education and the labor market.

Table 2: Types of educational outcomes in the study of IEO

Outcome	Opportunities of individuals from different social groups
Access	Getting into some educational level, track or program.
Attainment	Completing an educational level or program.
Choice at transitions	Attending a certain track, type or quality of the program/educational institution, field of study, etc.
Achievement	Competencies developed at a given educational level.
Labor outcomes	Income or occupational status as a result of the education attained.

Source: Own elaboration adapted from Farrell's (2012) classification, consisting of four 'facets' of educational inequalities: access, survival, output, and outcome.

In the strict sense, *access* is not considered an educational outcome. However, one can treat it as an accomplishment by an individual to enter certain educational level, grade, track or institution. Even though access and attainment are related, the former does not imply the latter, as the student can eventually drop out. *Attainment* in education has been typically measured in two main ways: by years of schooling completed or by the highest educational level attained. Either as numerical or categorical variable, this is the most common educational outcome analyzed in the literature on social mobility. For comparative purposes, formal education can be measured by levels and codified by the International Standard Classification of Education (ISCED).[10] Due to concerns that the educational credential obtained matters more than the time to attain it, the highest degree completed is more frequently used. The question here is whether social origin determines educational completion or graduation.

9 Lucas and Beresford (2010) also discuss controversies in the measurement of multiple dimensions of in-school experience, attainment, and achievement.

10 Developed by UNESCO (UIS, 2012), ISCED is a classification of educational programs and related qualifications by levels and fields, with the purpose of compiling and analyzing cross-nationally comparable data. This classification establishes 9 levels of education, namely: ISCED 0 early childhood; ISCED 1 primary; 2 ISCED low secondary; ISCED 3 upper secondary; ISCED 4 post-secondary non-tertiary; ISCED 5 short-cycle tertiary; ISCED 6 bachelor's degree programs; ISCED 7 master's degree programs; and ISCED 8 doctoral degree programs.

Educational choices involve doing certain transitions or not (i.e., dropping out), as well as choosing tracks, institutions or programs at a certain educational level. In this regard, a possible question to investigate, for example, would be to what extent the person's social origin has an impact on his or her enrollment into a particular type of institution (e.g., private or public) or a specific track (e.g., academic or vocational).

Achievement is commonly measured in terms of test scores and school grades, but the former are preferred over the latter as grading standards can vary by schools and curriculum. Although performance in a test is not a perfect measure of learning, the development of a set of international *large-scale assessment studies* has increased the inclusion of educational achievement in educational research on IEO. Over more than 60 years, these studies have had a significant impact on educational policy, by evaluating diverse knowledge domains, such as mathematics, reading, and science, for different age groups. With a growing participation of countries worldwide, the PISA program is perhaps one of the best known international standardized surveys.[11] These tests have been a rich source of information for cross-national analyses on student achievement, which have attracted attention among researchers, policy makers, and practitioners in education. Particularly, human capital scholars have produced abundant empirical literature using these data since cognitive skills have been found to be much more strongly correlated with economic growth than attainment (Hanushek & Wößmann, 2007).

In intergenerational mobility studies, 'destination' variables typically refer to *labor outcomes*, that is, the position or outcomes reached by individuals in the labor market. This variable has been measured through income, job status or occupational class, with respect to that of their parents in their youth. In sum, a notable advantage of the O-E-D triangle is the possibility to assess inequalities in education according to different types and measures of educational and occupational outcomes, which is a task that econometric models have not been able to fully undertake.[12]

11 Other international studies are: the International Association for the Evaluation of Educational Achievement's Trends in International Mathematics and Science Study (TIMSS), the Progress in International Reading Literacy Study (PIRLS) applied to younger students, the International Adult Literacy Survey (IALS), and the Program for the International Assessment of Adult Competencies (PIAAC).

12 From the economics of education perspective, one attempt in this direction is the work of Gamboa and Waltenberg (2015), which combines access and achievement in a measure of a composite index of equality of opportunity in education for comparative cross-national studies.

3 Empirical Research on Educational Inequalities

In the previous chapter four different research traditions were introduced: (1) sociological studies on inequality of educational opportunities, (2) educational effectiveness research, (3) intergenerational mobility studies, and (4) higher education research on expansion and stratification. They will now be reviewed in greater detail. The description is not intended to be exhaustive, but as complete as possible to expose how the different research lines have approached the empirical study of educational inequalities from different conceptual perspectives, at different levels of analysis, and with several methodological strategies.

3.1 Sociological Studies on Educational Inequality

Sociological research on educational stratification has produced abundant evidence of how individuals from privileged social origins receive 'more' and 'better' education than those with low socioeconomic backgrounds (e.g., Jackson, 2013a; Jackson, Luijkx, Pollak, Vallet, & van de Werfhorst, 2008; Mullen, Goyette, & Soares, 2003; Shavit, Arum, & Gamoran, 2007; Shavit & Blossfeld, 1993). Allegedly, this advantage allows them to have a better performance throughout their educational and occupational trajectories, and thus, to attain higher social positions. Although different approaches coincide in predicting a strong association between social origin and student achievement, it is not clear, however, to what extent the importance of family's financial, educational, cultural, and social resources explains this relationship. Also, how these constructs are defined and operationalized depends on the theoretical approach and the specific contexts (Caro, Sandoval-Hernández, & Lüdtke, 2014).

Here two main research strands on the analysis of the O-E association will be presented: *academic achievement studies* and *studies on educational choices*. While the former looks for a measure of IEO in students' performance and its changes across cohorts, social groups or countries, the latter addresses temporal variations of IEO in attainment over the individuals' life course.

3.1.1 Academic Achievement Studies

The work entitled *Equality of Educational Opportunity* (Coleman et al., 1966) was the final report of a sociological study conducted by James Coleman and his team, commissioned by the United States Department of Health, Education and

Welfare in the 1960s. The well-known Coleman Report documented those differences in school resources that were impeding the educational success of racial and ethnic minority children. With a sample composed of over 600,000 primary and secondary students, the report analyzed their performance in different tests (e.g., reading comprehension, math, verbal skills, and non-verbal associations) and the possible relation with characteristics such as race, age, gender, and socioeconomic conditions. Three dimensions of school factors were analyzed: staff properties, curriculum, material facilities,[13] and characteristics of fellow students within class or group. Once the social background was controlled, the three dimensions of school factors together accounted for 5–9% of the variance in individual performance. Among the three dimensions, the average background characteristics of peer group had a largest effect. However, beyond the institutional characteristics analyzed, the Coleman Report concluded that the socioeconomic and ethnic origin of pupils was the strongest predictor of academic performance.[14]

This line of studies conducted by "equality empiricists" in sociology of education between mid-1960s and early 1970s was paralleled by the work of stratification theorists documenting trends of social mobility (Lynch, 2006, p. 87). Stratification research was highly influenced by Blau and Duncan's pivotal study on *status attainment*, which will be described in next sections of the present chapter. An example of the linkages between the two empirical traditions is the research of Jencks et al. (1972), who extended Coleman's findings in the context of the United States by employing an analytic model based on the path analysis technique – pioneered by Duncan (1966) in the framework of the status attainment literature. Even though Coleman, Pettigrew, Sewell, and Pullum (1973) criticize its main arguments, the study of Jencks and his team came to a similar conclusion: academic achievement is strongly correlated to the student's cognitive abilities and socioeconomic and ethnic background, leaving the school characteristics as a secondary factor. Furthermore, the study found no evidence that inequalities in occupational status and income could be substantially reduced via educational reforms. After Coleman and Jencks had pioneered the sociological studies on IEO, several large-scale works on the topic started to be undertaken in various developed nations.

13 School facilities and services included aspects such as: existence and conditions of buildings, cafeteria, health room, laboratories, sports field, library (number of books), auditorium, psychological service, etc.

14 For subsequent reviews of his work, see Coleman (1969, 1975); and for a review after 40 years of the Coleman Report, see Teese, Lamb, and Duru-Bellat (2007).

3.1.2 Studies on Educational Choices

An important issue to consider in the study of IEO consists of educational decisions at transition points, rather than the final schooling attainment. As pointed out by Kerckhoff (2001), social stratification is both a condition and a process; and as a process, it refers to the ways in which individuals are distributed into stratified social positions. This process occurs over different stages of the life course, through transitions between educational levels and during the transit into the labor market. Therefore, the analysis of educational choices across trajectories might further the understanding of educational inequalities. Two main lines of inquiry within this group of studies will be described here: *tracking studies* and the *studies on educational transitions.*[15]

Tracking Studies

Education systems are often organized into *tracks*, in the form of different educational programs or types of schools. Research on tracking deals with the way students are (either formally or informally) sorted to diverse tracks during their educational career. A central concern in these studies "… is not with academic achievement per se but with the differences in achievement associated with differences in track placement" (Ramirez, 2006, p. 435). Thus, track allocation is analyzed as an educational outcome in itself, since it can have consequences on student performance, but also on longer-term educational and occupational outcomes.

The empirical literature in this area examines to what extent social background determines individuals' allocation to different tracks. A handful of studies have shown that different forms of tracking repeatedly locate students of disadvantage origins in low-ability groups and students of privileged families in high-ability groups (Kerckhoff, 1995), either within or between schools. As a result, tracks differ not only by curricular specialization but also because they are hierarchically structured by student performance (Hanushek & Wößmann, 2006; Lucas, 2001). As stated by Lucas and Beresford (2010, p. 40):

> Students' curricular placement in the school is analogous to adults' occupational placement in the economy – both are nominal designations, both constrain the

15 Although the division between tracking studies and educational transitions tradition is usually made in the literature, Lucas (2001) has described it as unfortunate, as they are rather complementary.

> tasks to which persons will orient, and thus both dramatically differentiate persons' experiences.

One of the issues that has attracted most attention is the division between academically-oriented and vocational-oriented curricula, which is typically found in the transition between lower- and upper-secondary education levels, and even earlier in some national education systems (e.g., the Netherlands or Germany). A large body of research has widely analyzed how highly *differentiated* secondary school systems (i.e., those that separate students into vocational and academic training) lead to divergent educational paths and, subsequently, to unequal academic results and occupational destinations, as compared to *comprehensive* systems (Blossfeld et al., 2016; Erikson & Goldthorpe, 1992; Shavit & Müller, 1998). While the question of whether more comprehensive systems reduce social gradients in student achievement is still a subject of debate in many countries, some researchers (e.g., Burger, 2016) have explored additional dimensions of education systems producing social segregation through tracks, such as private schooling, annual instruction time, school location, which may intensify the link between social origin and academic achievement.

Studies on Educational Transitions

A second line of inquiry addresses the study of IEO in terms of completing a sequence of transitions. Designed by Robert Mare (1980, 1981), the transition model of educational inequality typically uses retrospective data on educational attainment to deduce the individual's continuation decisions at each educational transition. In general terms, this model consists of measuring the odds ratios of continuing certain educational transition, conditional on having completed the previous transition. From this perspective, the study of IEO involves the analysis of educational attainment as a series of subsequent educational transitions, by disaggregating individuals' schooling trajectories into a sequence of discrete outcomes. In Mare's (1980, p. 295) words:

> Such a concern is important for understanding how educational attainment depends on family structure and socio-economic characteristics because all phases of schooling may not require the same familial resources and structural advantages. In addition, some school transitions, such as the decision whether to attend college, are simply of intrinsic significance.

Based on this model, a growing body of studies has explored the nature and intervening factors of the association between socioeconomic background, educational transitions, and school progression, with a special focus on the sequence and timing between transitions. The introduction of event-history models in the study of educational transitions (Mare, 1992) constitutes an important methodological innovation in the sociological stratification research after the status attainment scheme of Blau and Duncan (see Section 3.3). Original studies and further extensions (e.g., Stolzenberg, 1994) have predominantly focused on investigating whether the achievement gap associated with socioeconomic background changes across school progression and through educational transitions. This question is of critical importance to policy applications as it contributes to the understanding of how and when inequalities among socioeconomic groups are reproduced throughout educational trajectories (Caro & Lehmann, 2009).

Most works in this tradition suggest that the achievement gap between students of high and low socioeconomic status tends to widen as students get older. Because of their low performance at school, they are prone to drop out and are less likely to attain higher levels of education, or hold high occupational positions. Conversely, a few studies have found that there is little or no effect from social origin at the higher education levels. From a comparative perspective, studies on trends in educational transitions have also found a dominant pattern of decline in educational reproduction over time (Shavit & Blossfeld, 1993).[16] In the light of contradictory findings, some authors (Caro & Lehmann, 2009) have suggested that this divergence seems to depend mostly on differences of methodological designs.[17] The debate on the topic seems to still remain open.

3.2 Educational Effectiveness Research

The origins of this research tradition, known as educational effectiveness research (hereinafter EER), could be traced back to the mid-1960s as a reaction to

16 Although the odds of making educational transitions remained unchanged.

17 The classic transition approach uses a non-linear probability model (logit or probit). Due to some limitations regarding the statistical techniques, scholars have recently considered ordinal logistic regression models, which analyze 'unconditional' transitions, that is for instance, the likelihood of completing the academic track of upper secondary education independent of previous educational enrollment (Bukodi, Erikson, & Goldthorpe, 2014, e.g.,). As an alternative, linear probability models (ordinary least squares OLS) have also been used (e.g., Bernardi & Cebolla, 2014). For a discussion on the contributions as well as the criticisms posed to the transition model approach in the study of IEO, see van de Werfhorst (2014).

the work on IEO undertaken by Coleman from a sociological framework, and Jencks from a socio-psychological approach. As briefly outlined in the previous section, both pioneer works came to similar conclusions about the reduced effect of school factors on explaining the achievement gap among students from different socioeconomic background. The pessimistic conclusions of these studies about the low or lack of school effects on individual educational outcomes gave rise to extensive critiques, policy discussions, and further research. In particular, the main criticism to the studies on academic achievement was that social background could not be altered through educational policy. In the midst of hesitations about the liberal idea of the equalizing role of education systems in students' life chances,[18] EER became an important research line in education with a clear application in educational policy.

The comprehensive term *educational effectiveness*[19] is one of the measurable facets of the broad notion of *educational quality* (Scheerens, 2015). Even though the term *quality* was not used in the literature on education until the 1990s (Kumar & Sarangapani, 2004), the notion of educational quality came along when educational researchers took it from the industrial context in the post-war period. Initially, the notion was applied to managerial issues within schools, but it gradually started to expand to educational aspects. In particular, economic studies from the human capital theory – which in its different conceptions (e.g., Becker, 1964; Schultz, 1960) consider education as the driving force of economic development – started progressively to find a significant positive correlation between school quality and earnings.[20] In this context, the issue of educational quality

18 According to Thrupp (1995), alternative views – with their subsequent policy implications – were derived to account for the impossibility of schools to promote equality of opportunity: from the right wing, the reason laid in intelligence determined by genetics (Jensen, 1969); for the Marxist left, schools could not promote equality as they were agents of the dominant social class (Bowles & Gintis, 1976); and for the liberal left the solution did not lay in education but in other social and economic policies (Jencks et al., 1972). A discussion on ideological issues, nonetheless, falls outside the objectives of the present book.

19 Even though the term *school effectiveness research* is more frequent in the literature, this book uses the equivalent term educational effectiveness research as it implies a wider meaning including effectiveness not only due to school factors, but also to teaching/instructional conditions, and characteristics of education systems, among others.

20 For a review of the initial studies, see Hanushek (1986). The widespread, modernist idea of the positive relationship between education and economic, political, and cultural development has been, however, also object of criticisms: see, for instance Chabbott and Ramirez (2006).

became even more important than the 'quantity' of schooling in the wage determination process, and a major concern in the policy arena (Hanushek & Wößmann, 2007).

The EER tradition has produced an extensive body of literature focused on what 'good' educational quality means at different levels (e.g., classroom, institution, system). Due to the multidimensional character of the concept, there is no consensus on its definition or the way to measure it. However, student academic achievement is a frequently used indicator of educational quality in national and comparative studies.[21] The recent emphasis on achievement as a central measure in education has possibly to do with three related aspects. First, the growing evidence of the much stronger correlation between a population's skills and the economic growth of a society than mere school attainment (Hanushek & Wößmann, 2007). Second, probably because of the dissemination of Rawl's conception of justice, it has become increasingly relevant "… to focus not on the highest level of education achieved but rather on the shared basic level of knowledge and skills needed for one to make a good living" (Duru-Bellat, 2015, p. 325). And third, there is a spreading concern on cross-national comparisons based on international large-scale assessments (e.g., PISA) that have led to a productive research line of comparative studies on performance.

The main objective of EER is to identify and analyze the factors operating at various levels – such as classroom, school, and education system – that can explain variations in students' educational outcomes (Scheerens, 2004). Since EER encompasses different levels of analysis and a diversity of methodological approaches, and it also varies in the selection and use of indicators, measures, and the independent and dependent variables, EER is not a homogenous research field, and it has been called a 'conglomerate' of research by some authors (Kyriakides, 2020).

Even though there is no conventional taxonomy of sub-areas within EER, three main strands of research could be identified: (i) production function studies focused on economic factors related to education, (ii) studies on school effectiveness, and (iii) research on effective teaching and instruction. These strands do not follow a chronological order, but they arise from different foci of study. Thus, in the existing numerous historical reviews of EER (e.g., Reynolds, Teddlie, Creemers, Scheerens, & Townsend, 2000), these sub-areas can appear simultaneously and sometimes overlapped.

21 For a review on the various dimensions of quality in education, see Blanco (2011, pp. 36–38).

Although all research strands coincide on taking educational outcomes – typically student achievement – as the dependent variable, they differ in the independent variables under analysis. Whereas sociological studies on IEO – introduced by Coleman and Jencks that historically triggered EER – mainly focuses on the impact of social origin of students on educational outcomes, EER studies emphasize issues related to the classroom, school, system or context levels that also might have an effect on student achievement: (i) production function studies predominantly analyze 'resource' inputs of schools (e.g., teacher salaries, institutional resources, and teacher/pupil ratio); (ii) effective schools research focuses on the internal functioning of institutions (e.g., educational leadership, secure climate, expectations on achievement, etc.); and (iii) studies on instructional effectiveness are centered on learning time, class organization, teaching and evaluation methods. Apart from instruction-related aspects, the latter also examine psychological variables of both teachers and students underlying learning processes. Table 3 summarizes the main characteristics of these strands, which will be depicted in the next subsections.

Table 3: Three strands in educational effectiveness research

Strand	Independent variables	Core discipline
(i) Production function studies	School resource inputs (e.g., school size, student/teaching staff ratios, infrastructure, teacher training and compensation).	Economics
(ii) School effectiveness	Characteristics related to school processes (e.g., organizational and managerial issues, such as classroom climate, school autonomy, educational leadership, evaluation practices, and parental involvement).	Interdisciplinary pedagogy, economics
(iii) Effective teaching and instruction	Characteristics related to teaching and instruction strategies (e.g., classroom management, teaching practices, instruction time,[22] monitoring performance, school's learning model), as well as psychological variables of both teachers and students underlying learning processes (e.g., motivation, intelligence, learning aptitude, cognitive engagement).	Educational psychology

Source: Adapted from Scheerens (2004, p. 13) and complemented with OECD (2004, p. 208).

22 It refers to issues such as age at entry into primary education, number of lessons per week, years of compulsory schooling, school day, etc.

3.2.1 Production Function Studies

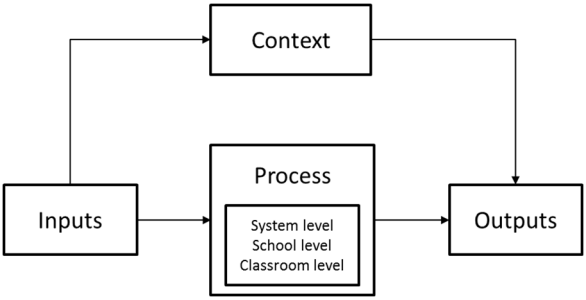
School effects research emerged with the aim to demonstrate what the titles of these books suggested: *Schools can make a difference* (Brookover et al., 1979, cited by Scheerens, 2004) and *School matters* (Mortimore, Sammons, Stoll, Lewis, & Ecob, 1988) to student performance. The first studies in this strand analyzed input variables such as pupils' background and school resources to predict level of achievement. The *input-output* studies, also referred to as the *education production function* or *cost-quality* studies (Hanushek, 1986), have been mostly undertaken by economists of education from the theoretical approach of human capital. The main task in this group of studies has been to identify the impact of relevant input conditions (e.g., as class size, teacher quality, school policies, and students' aptitude) on outputs (e.g., tests scores and grade completion) at primary and secondary schools.

Over the years, the production function studies have been expanded and sophisticated, by employing alternative methods and introducing different variables and measures. One of their major challenges has been opening the 'black box' and thus determining those intervening "throughput factors" (Scheerens, 2004, p. 1) or variables related to the educational process ongoing at schools (e.g., leadership, expectations, climate, etc.). As a result, the initial studies based on the input-output paradigm were modified by new, more complex models on the functioning of education, including processes and context. A comprehensive model of EER is illustrated in Figure 3, which is composed of four basic elements: input, process, context, and output.[23] In addition, educational processes can be analyzed at different levels (i.e., pupil, classroom, school, and national education system levels), which are typically integrated with multilevel analysis' techniques[24] (Scheerens, 2004).

23 See Murillo (2007) for a summary of alternative comprehensive conceptual models.

24 *Multilevel analysis* or *hierarchical linear models* – also known as *random-coefficient regression models* in economics, *covariance components models* in statistics, or *mixed-effects models* and *random-effects models* in biometric applications (Raudenbush & Bryk, 2002) – were developed in the 1980s (Aitkin & Longford, 1986). These models started to be implemented in educational research since the 1990s and have become one of the most powerful statistical techniques that allow educational researchers to face up to the frequent criticisms to the classic studies regarding the mixing of units of analysis. In general terms, multilevel modelling is an extension of the classical multiple linear regression models that makes it possible to deal with observations that are not independent as they belong to different

Figure 3: A comprehensive model of production function studies



Source: Scheerens (2015).

The comprehensive model has progressively gained in complexity by introducing several process and context variables in the classic input-output scheme. This amplification of factors do not constitute, however, an advancement towards an explanatory theory of educational effectiveness (Blanco, 2011, p. 112). Although EER promoters have criticized Coleman's study design, a weak association between school inputs and student outcomes has been the trend in the research tradition of educational effectiveness since the 1980s (Hanushek, 1986), particularly in industrialized countries. It seems that the lower the development of a country, the higher the school effects on educational outputs (Heyneman & Loxley, 1983; Piñeros & Rodriguez, 1998).

3.2.2 Studies on School Effectiveness and Effective Instruction

Studies on school effectiveness aim at providing evidence of what makes a school effective, by focusing on organizational and managerial characteristics of schools, such as administrative leadership, institutional autonomy, school and classroom climate, evaluation of pupil progress, achievement orientation, staff development, and parental involvement. In a complementary way, there is also an interest in analyzing *ineffective* institutions, where problems like dropping out of school or repetition are a matter of concern.

levels of aggregation (e.g., pupils in classes, classes in schools, schools in neighborhoods, neighborhoods in communities, and so on). With different statistical techniques (e.g., repeated measurements, binomial regression, Poisson regression, multivariate models) and with the availability of specialized software for the analysis of multilevel data, such as M*plus* package (Muthén & Muthén, 2017), studies based on multilevel models can analyze the variation in educational outputs at different levels of the hierarchical structure of educational data.

In the 1990s, several studies started to examine the relationship between school effectiveness and *effective instruction,* that is, those instructional characteristics that may have an impact on students' achievement (i.e., structured teaching style, effective learning time, and correspondence between items taught and those tested) (Scheerens, 2004). This group of studies has been of special interest among educational psychologists, who have widely analyzed the impact of teachers' instructional methods and expectations around children development on student learning. One of the most famous studies is a vast synthesis of over 800 meta-analyses, by which Hattie (2008) has identified the relative effects of different factors in six areas – student, home, school, curricula, teacher, and teaching and learning approach – on achievement.[25] More recently, some researchers have also introduced the less-common term *system effectiveness* (Scheerens, 2015) that refers to those conditions at the level of education systems that can be associated with student outcomes (e.g., policies enhancing school autonomy, accountability, and choice).

Another group of studies in this line also emerged with the aim of analyzing the differences in performance *between* and *within* educational institutions. Research on between-school effects examines school performance variations due to differences in resources, academic climate or composition of students, whereas within-school research intends to account for variations of performance among pupils at the same institution that are attributed to characteristics of the learning environment and/or organizational issues that can create unequal educational opportunities (e.g., ability grouping and tracking) (Jones & Schneider, 2009). According to Triventi, Kulic, Skopek, and Blossfeld (2016), there are two major dimensions for classifying differentiation forms in secondary education – which is the level most frequently studied in the literature on tracking and ability grouping, and on school quality and effectiveness (see Table 4). The first dimension distinguishes between external (between) and internal (within) differentiation. The second dimension refers to *formal* and *informal* characteristics.[26] While the former have to do with regulated forms of diversity, the former refer to types of education that are not formally recognized but that may have an impact on the quality of instruction and learning.

25 Further extensions of this project made the author update his former list of 138 effects to 150 effects in 2011, and to a list of 195 effects in 2015 for higher education (Waak, 2018).

26 As will be discussed further in this chapter, the formal/informal dimension has been a central concern of studies on higher education differentiation.

In the framework of educational inequalities, the question about what an effective school means becomes more complex, and it is common to find contrasting views. On one hand, some authors (e.g., Murillo, 2008a) claim that effectiveness goes together with equity. According to this idea, an effective educational institution is not only the school that produces successful results in standardized tests or other measures of students' academic achievement. It is also the school that accomplishes to minimize initial inequalities among students that affect learning, thus obtaining better results as those expected given their input constraints, including previous performance, and socioeconomic and cultural background. On the other hand, other authors maintain a different opinion about equity in education (e.g., Nuttall, 1990, p.25, as cited in Mortimore, Sammons, & Thomas, 1994, p. 317):

> … natural justice demands that schools are held accountable only for those things that they can influence (for good or ill) and not for all the pre-existing differences between their intakes. The investigation of differential school effectiveness, concentrating on the progress students make while at that school, therefore has a major role to play in the future.

Table 4: Classification of main forms of differentiation in secondary education

	External (between schools)	**Internal (within schools)**
Formal	– Formal school tracks – School sector (public/private) – School specialization (academic/vocational, etc.)	– Specializations – Subjects on advanced level
Informal	– School reputation (ranking) – School resources* – Student composition at the school level	– Teachers' characteristics in different classes – Ability grouping (class composition)

Source: Adapted from Triventi, Kulic, Skopek, and Blossfeld (2016, p. 11).

Notes: *School resources also include indicators such as: pupil-teacher ratio, class size average, or percentage of teachers with high-level qualifications.

A group of authors within EER often identify an additional research stream[27] focused on analyzing the processes whereby institutions can be modified. The interest of this strand was no longer describing effective schools but creating them. In the early to mid-1980s, these reform-oriented studies aimed at pursuing

27 For a critical viewpoint see Thrupp (2001, p. 8).

the equity ideal and their main emphasis was on institutions from low socioeconomic strata. The central question that addressed these projects was: How can we produce better institutions for the *disadvantaged* students? From the late 1980s to the present, research in this line has broadened the question: How can we produce better institutions for *all* students? (Reynolds et al., 2000). With this initiative, a group of educators, scholars, citizens, and policy makers came together to work on public school reform.[28]

On the whole, this fruitful research tradition has produced considerable empirical evidence that has been widely applied for policy purposes, particularly with the movement of school improvement and the impact evaluation studies (Creemers, 2002). The latter includes the evaluation of strategies oriented to influence school conditions in order to raise students' academic achievement, such as: vouchers, charter schools, peer effects, teacher quality, and direct incentives, among other factors. More recently, *value added studies* have been developed and nowadays constitute an important research line of the EER agenda in primary and secondary education. The term has come to be used to design studies addressing the question of how much 'value' does the school add to student learning under his or her circumstances of origin and whose abilities differ at intake.[29] In this sense, value-added models are very much oriented towards the issue of IEO. In spite of their frequent use and importance in the policy design for equity, added-value models have not escaped criticism.[30]

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28 The best known exponent was Ronald Edmonds (1979) in the United States, who identified five factors of effective institutions: strong administrative leadership, orderly school climate, emphasis on basic skills, high expectations for all students, and continuous evaluation of students' progress. In Germany, this paradigm was known under the term *Schulentwicklung* and proved very influential for decades, mainly connected with the writings of Hans-Günter Rolff (1991).

29 *Value added* was a technical term in economics which was transferred into educational research in the 1980s. By the late 1990s, the concept became of common use among governmental officials, policy makers, school managers, and teachers, as "a more accurate measurement of students' performance and therefore of the quality of their education" (Saunders, 1999, p. 233). The term has also been used in the framework of institutional indicators of efficiency and effectiveness within higher education institutions in order to justify funding allocation.

30 For instance, Goldstein (1997) argues that value-added indicators usually have too much uncertainty when establishing the particular performance of a school, especially with small student numbers. He also claims that these estimates could only be analyzed in relation to the performance of other schools, and are not useful to analyze improvement over time. In a similar line, Troncoso, Pampaka, and Olsen (2015, p. 293) point out that "traditional value-added models fall short of addressing the complex phenomenon of academic performance, because they largely overestimate school effects".

3.3 Intergenerational Mobility Studies

In the social stratification research area, studies of inequality of opportunities typically are about attainments of educational qualifications and social positions (e.g., occupation, social class, etc.) (Breen & Jonsson, 2005). This section will present those studies on occupational attainment, which are focused on the overall association between social origin and occupational destination, and the role of education as an intervening variable in that association. It is to be noted that the boundaries between studies of intergenerational mobility and those of IEO are often not clear-cut.

Intuitively, inequality and mobility go together, yet they are indeed different phenomena (Hout, 2004).[31] Studies on intergenerational mobility not only inform "…about the amount of inequality at two points in time (or for two generations), but also enlighten about the opportunities for an individual to move between different class positions, therefore revealing either the openness or rigidity of a given society" (Pollak et al., 2007, p. 9). In general terms, a weak association between parents' and adult children's socioeconomic standing indicates high equality of opportunity, which is an indicator of social *fluidity*.[32] In contrast, if what was attained by the parents determines the later achievement of their children (i.e., where there is a persistent influence of such advantages starting at birth) this is a characteristic of *rigidity* in a society. Here it is worthwhile noting the sociologists' distinction between *absolute* and *relative* rates of social mobility (or *structure* versus *circulation* mobility). Contrary to absolute measures, relative mobility serves as a measure of social fluidity or openness of the occupational structure, as it controls for the changes in the marginal distributions of occupational groups. For instance, during periods of industrialization and economic growth, higher-status occupations expand and lower ones contract, thus

31 Evidence for the inequality-mobility link is still inconclusive. Some works have found that when equality of opportunities exists, there is equality of conditions in the long run, but the opposite is not necessarily true. In contrast, other studies suggest that societies with higher equality of conditions are most likely to have equality of opportunities for their members. A deeper discussion on the spurious relationship between the two is in Torche (2015).

32 However, Jencks and Tach (2006) argue that equality of opportunities does not directly lead to social mobility. Their main arguments can be summarized as follows: on the one hand, equal opportunity does not require eliminating all sources of economic resemblance between parents and children (e.g., inherited abilities or values); and on the other hand, "the intergenerational correlation of socioeconomic standing is not a good indicator of how close a society is in equalizing opportunities" (Jencks & Tach, 2006, p. 23).

producing upward mobility, regardless of the structural rigidity (i.e., to what extent social origin influences occupational success) (Blau, 1992).

Overall, two main levels of analysis in sociological studies on intergenerational occupational mobility can be distinguished: *modeling* and *comparative studies* (Scherer, Pollak, Otte, & Gangl, 2007), which focus on mechanisms and trends, respectively. Although most studies address either mechanisms or trends in the study of social mobility (i.e., static conditions vs. dynamics of change, following the dichotomy by Lucas and Beresford (2010), they are not mutually exclusive.

3.3.1 Modeling Studies

From a micro-theoretical approach, researchers in the first group of studies have concentrated their interest in modelling the pathways which individuals take from origin to destination. These studies focus on the causes and consequences of existing inequalities (Morgan, 2006) or, in other words, they are oriented toward the underlying *mechanisms* in the transmission of advantage. According to Lieberson (1987, cited by Goldthorpe, 2007b, p. 6), a theoretical understanding of what causes the existence and persistence of the association between social origin and individual's outcomes (i.e., studies on mechanisms) needs to be obtained before the trends of weakening or strengthening this association over time or across societies (i.e., by way of comparative studies) can be explained.

Contrary to the research focused on inequality of conditions, an advantage of the studies on inequality of opportunities is that they allow identifying those processes whereby the transmission of social inequalities between generations occurs (Solís, 2012). In other words, the association of families' and children's conditions allows researchers to elucidate the underlying mechanisms in the transmission of advantage, as the intergenerational association may occur through different sources that include socio-demographic, economic, and cultural resources. Thus, instead of remaining at a merely descriptive level, research based on inequality of opportunities attains an explanatory level. Nevertheless, some authors have put into question that studies on inequality of opportunities actually disentangle causal processes or mechanisms for the persistence of advantage.[33]

33 For instance, following Jencks and Tach's argument (2006), Torche (2015, p. 361) has argued that it is difficult to disentangle the causal effect of different mechanisms, as in the case of genetic inheritance or cultural endowments transmitted through early socialization of tastes.

In the early 1950s, social mobility research was traditionally based on standard *mobility tables*, that is, the simple two-variable analysis by the cross-tabulation of the individuals' occupation with that of their parents. Different techniques have been used to analyze these tables, as for example: simple percentage of origin by destination or vice versa, contingency table analysis, and stochastic matrices (Duncan & Hodge, 1963). Analyses based on these tables are useful at the aggregated level, expressed either as the total effects of origin on destination or as conditional probabilities of destination given conditions at the origin. However, they do not allow distinguishing the underlying mechanisms in the process of stratification.

In the late 1960s, Blau and Duncan pioneered the *status attainment model*, which represents a substantive contribution in the reconceptualization of mobility studies into a process of status attainment of individuals. Its importance also resides in its methodological innovation by extending the analysis beyond the origin-destination bivariate focus and examining intervening variables, such as educational attainment. With the introduction of intervening educational variables in the origin-destination scheme, it is possible to distinguish the particular role of education in the intergenerational transmission of inequality. How important are educational variables in mediating the association between an individual's social origin and his or her destination? This question is not only of great interest for sociologists, but it is also one of central importance in educational policy. If education is the driving force of social mobility, then the emphasis on educational policy would be justified. But if, conversely, the direct effect of social origin on individual occupational attainment is stronger, then factors underlying this effect (e.g., differences in living conditions or cultural resources at home) would be the primary ones to be addressed by corresponding policies.

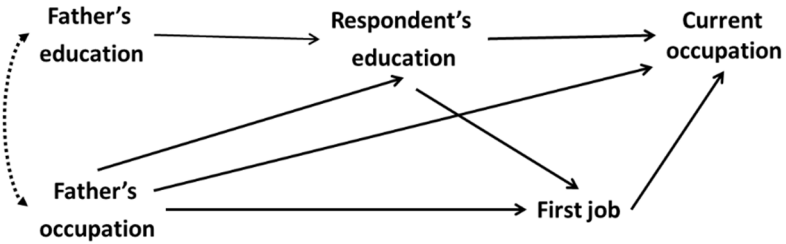
The O-E-D triangle described earlier in Chapter 2 was originally based on the classic study on occupational mobility in the United States, published in the book *The American Occupational Structure* (Blau & Duncan, 1967). In general terms, this study consisted of a causal chain that allowed estimating the relative importance of different paths connecting socioeconomic origin and other attributes to outcomes, specifically on occupational status, through educational attainment.[34] Particularly, the model uses the father's educational and occupational variables as indicators of individual's social origin (see Figure 4). Individual educational attainment is measured by the number of years of school attendance, and occupational outcomes are assessed at two points in time: the first job and

34 For a detailed review of the status attainment model, see: Contemporary Sociology (1992); Kerckhoff (1995); Hout and DiPrete (2006).

the current occupation at the time of the survey (1962). The concept of occupational status was first used in the model, as a one-dimensional numerical measure based on father's educational attainment and earnings. Later, several updates and refinements have constructed an occupational status index with the possibility to make international comparisons.

Administered to a sample of more than 20,000 male respondents, the study found that ascriptive features had an influence on occupational success. Also, independent of social origin and education, socioeconomic status of the first job substantially affected individuals' subsequent careers. But the most salient conclusion of Blau and Duncan's study was that educational attainment predicted better the occupational destination than the family's socioeconomic background. In other words, father's education and occupational status affect individual's occupational outcomes directly, but their effects are weaker than those of individual's education attainment.

Figure 4: The *status attainment* model



Source: Basic model without path coefficients (Blau & Duncan, 1967, p. 170).

Despite frequent criticisms to the status attainment model – regarding it as a merely descriptive and atheoretical study with methodological problems, such as the causal ordering of the variables as well as measurement and response errors – this systematic research has made a significant contribution to sociology. The model has resulted in a very useful methodological tool for the study of social stratification, as a process in the life course. It has also stimulated much of the later interest in linear causal modeling of other social processes (Sewell & Hauser, 1992). But above all, this classic model has contributed to the understanding of "the extent to which schools create and constraint equal opportunities for all students to succeed in adult life" (Hallinan, 1988, p. 254).

Further developments in the specification of the intervening factors within the status attainment model have been made for samples of different groups of race, gender, and across countries. Also, mostly driven by the idea according to

which the appropriate test for equality of opportunities is the lack of influence of social origin on individual outcomes *net* of ability and effort (Sørensen, 2006), extensions of the model have analyzed other family conditions, personal abilities (e.g., intelligence, motivation), socio-psychological factors (e.g., parental support, educational and occupational aspirations, peer contacts), or school factors that intervene in the status attainment chain (Müller & Pollak, 2015).

The socio-psychological model of educational and occupational attainment known as the *Wisconsin model* (Sewell, Haller, & Portes, 1969) is one of the most relevant extensions. It replicated the status attainment process, but with an emphasis on the role of mediating psychological variables, such as the influence of significant others (i.e., family members, peers, and teachers), cognitive skills, and educational and occupational aspirations. Overall, the study has found a predominant role of the socioeconomic status on educational attainment, aspirations and income through parental and peer influence. During the 1970s and early 1980s, several variations of the Wisconsin model have been conducted, including additional variables, as for example, gender, siblings and family structure (for a summary, see Sewell & Hauser, 1992). Although more recent studies have continued to introduce other mediating variables into the models, some authors see these attempts as problematic since those mediators (e.g., academic achievement, aspirations, personality traits, and cognitive skills) might be correlated with unobserved determinants of socioeconomic background, "making the models uninformative in terms of causal processes" (Torche, 2015, p. 364).

3.3.2 Comparative Studies

In the second group of studies of intergenerational social mobility, scholars have analyzed the *trends* of social fluidity through changes in the origin-destination relationship over time and place (i.e., across cohorts and between countries). These works are best represented by cross-national comparisons, which have mostly concentrated on Western European countries, the United States, Australia, Israel, and Japan. Studies at this analytical level focus on relative measures of mobility, that is, the association between parents' and children's economic wellbeing *net* of changes in the economic structure, historical context, and in the aggregated levels across generations. According to Torche (2015), the study of social mobility is essentially "comparative because no empirical society is characterized by either null association or perfect association between parents and children" (p. 344).

Over decades of development, four generations in the comparative stratification research have been identified (Treiman & Ganzeboom, 2000). In the late 1950s, the *first* generation addressed two main questions: how much mobility there is across generations, and whether societies differed in their degree of openness. By using occupational mobility tables, the main conclusion of these studies was that mobility rates and patterns were similar in industrialized countries – which afterwards proved to be incorrect. In the 1960s, the *second* generation turned its interest towards how intergenerational transmission of advantage occurs. With the use of multivariate statistical techniques (e.g., path analysis or structural equation modeling), scholars replicated the status attainment model in order to assess the relative importance of various paths to status attainment, also obtaining similar findings in various nations. The *third* generation came back to the use of intergenerational occupational mobility tables but with new statistical techniques (e.g., log-linear and log-multiplicative analysis). The major comparative project – the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) carried out in 12 countries with data collected in the 1970s (Erikson & Goldthorpe, 1992) – concluded that mobility patterns vary across nations because shifts in the occupational structure occur differently, but the relative mobility between occupational classes is similar across industrialized countries. Authors also pointed out that there is little evidence of an increase of mobility over time. By contrast, an analysis of 35 countries found that the rate of intergenerational mobility has increased (Ganzeboom, Luijkx, & Treiman, 1989). Lastly, the *fourth* generation started in the 1990s with a focus on how stratification outcomes are affected by institutional arrangements, which is an inherently comparative question, as it leads to the comparison of different social contexts (e.g., societies, regions, cities or schools) and/or at different points in time. Statistical procedures include mixed methods and the use of new designs, such as multilevel models that allow micro- and macro-level analyses.

In general terms, recent comparative studies aim at determining the extent to which openness or rigidity of the stratification system is related to macrostructural developments of societies (e.g., degree of industrialization, economic and political order, institutional arrangements, or particular policies). The availability of large-scale data from many countries during different time points have led to more and better descriptions of inequality of opportunity across countries and over time (Breen & Jonsson, 2005), along with impressive developments in the sophistication of statistical tools. Nevertheless, the research questions of comparative studies in social mobility have become progressively narrow, thus ne-

glecting the initial interest on the determinants and consequences of social mobility, and limiting the scope towards the bivariate O-D association (Treiman & Ganzeboom, 2000).

3.4 Higher Education Research on Expansion and Stratification

This section complements the exposition of the selected research traditions by introducing some analytical elements from the interdisciplinary research field of higher education. Studying IEO at the level of higher education is not only relevant as it is the most advanced educational level, but also because of its distinctive features. As pointed out by Shavit, Arum, and Gamoran (2007), the impact of educational expansion on social stratification at this level of education deserves special inquiry for three main reasons.

First, while in most economically advanced societies the levels of primary and secondary education have reached almost *universal* enrollment, higher education is still in a process of *massification* (Trow, 1972, 2006) in many countries.[35] In this sense, much of the studies on educational stratification have transferred their initial interest in secondary education to a major focus on the subsequent level of education. Second, higher education is directly linked to the labor market, since it is the 'gatekeeper' of professional positions. In other terms, higher education is supposed to be the provider of the credentials for entry into the professional labor market. The impact of higher levels of educational attainment on social and economic outcomes is often stressed at both micro-individual and macro-national levels. Analyzing the occupational outcomes obtained by higher education graduates is a very productive research line within the study of economic returns to university credentials and the economic centrality of higher education.[36] A third reason points to the fact that the higher education systems' structure is transformed inasmuch as the systems grow, particularly in market-oriented systems where expansion has also been accompanied by institutional

35 The concepts of *universalization* and *massification* of higher education will be used in the present study as referring to the process and stage of expansion of the higher education systems, following Trow's classification of elite, mass, and universal (Trow, 1972). The term 'mass higher education' has been traditionally employed to describe the growing demand to widen access to this educational level, beyond the former 'elitist' nature of universities.

36 Nevertheless, some critical approaches have called into question the alleged value of education as a key resource in the labor market, particularly in higher education, because of the current tension between devaluation of educational credentials and job precariousness (Solís & Blanco, 2014).

differentiation. Institutional differentiation is a distinctive feature of this educational level, particularly in market-oriented systems, which may have an effect on educational inequalities. Likewise, an additional point, highlighted by Wolter (2009), lies in the increasing demands placed to higher education regarding aspects such as outcomes, effectiveness, study success, and accountability in general, not only by researchers, but also by practitioners, policy makers, and politicians.

The field of higher education research has been classified according to disciplines,[37] themes, and institutional settings with a multiplicity of approaches. Considering the research topics of the field, Teichler (2000b, p. 15) identifies four main themes or "spheres of knowledge" that are summarized as follows by Wolter (2009): (i) quantitative-structural changes; (ii) transitions and processes; (iii) post-graduate training and academic staff; and (iv) organization, management, and governance. The first research line includes questions around the fluctuations of social demand for higher education, the consequences of expansion, the institutional structure and its changes (e.g., diversification, profiling or vertical/horizontal differentiation), among other related issues. This section takes up some elements belonging to this research topic, particularly about those structural characteristics of *expansion* (i.e., size) and *institutional differentiation* (i.e., shape) of higher education systems, and their impact on IEO.

3.4.1 Expansion and Institutional Differentiation

The expansion process of higher education systems has been one of the most important changes of the late 20th and early 21st centuries.[38] Although such a process is a worldwide trend, there are differences regarding the starting point, the extent, and the speed of this expansion (Wolter, 2013). Martin Trow (1973) proposed the well-known classification of the size of higher education systems consisting in three categories: *elite* (15% or less of the age relevant group participating in higher education), *mass* (16% and up to 50%), and *universal* (over 50%).[39]

37 Disciplines that contribute to higher education as a field: business studies, economics, education, law, history, psychology, political sciences, and sociology.

38 The educational expansion began in Europe and North America around 1945, a process that occurred after the establishment of national education systems between 1879 and the end of the First World War (Hadjar & Becker, 2009). In the rest of countries, the development of education systems took place over the past century, although to varying degrees (Meyer, Ramirez, & Soysal, 1992).

39 For an update on these concepts, see Trow (2006). Recently, more refined measures of expansion have been suggested: Brunner et al. (2005), for example,

Using this classification, numerous studies have widely described the growth pattern of national higher education systems. Since the 1960s in industrialized nations, small and elitist university systems fell into a process of massification in which higher proportions of students in the relevant age group started to enroll at this level of education (Altbach, 1999). The beginning of the 1990s was marked by the emergence of universal access to higher education in most of these countries. In developing nations, the expansion process started later but has followed the same pattern, as will be described for the Colombian case in Chapter 5.

While expansion refers to the size of the higher education system, institutional differentiation has to do with its shape, and both processes are intertwined (Teichler, 2008). Institutional differentiation[40] is commonly regarded as a consequence of expansion, but "it may also *contribute* to expansion, as new places become available in new segments of the education system" (Shavit, Arum et al., 2007, p. 4 emphasis in original). Teichler (2004) has recognized that the diversification process of higher education institutions encompasses both *formal* and *informal* dimensions.[41] The former include dimensions such as orientation (e.g., teaching- vs. research-oriented universities), types of programs (e.g., academic vs. professional) and levels of programs (e.g., sub-degree, bachelor, master, and doctoral programs). But there is also a diversification of institutions according to informal dimensions, defined as those "dimensions not visible in legal documents and official system descriptions" (Teichler, 2004, p. 4), which could be based either on vertical attributes such as 'excellence', 'quality' or 'reputation' – that progressively play an important role in the popularity of rankings – or on horizontal attributes like 'profile'.

The emergence of new types of higher education institutions has led to different models of higher education systems, which can be broadly divided into: *unified* and *diversified* systems. Unified or integrated systems are those with a

point out that in the 21st century the majority of countries have already surpassed the first threshold and three phases of *massification* in higher education can be distinguished: *initial* (15–33%), *intermediate* (34–50%), and *advanced* (51–74%). Universalization thus would correspond to gross enrollment rates of 75% or higher, as is the case of developed nations such as Australia, Finland, United States or South Korea.

40 The terms 'institutional differentiation' and 'diversification' in higher education will be interchangeably used throughout this book. For a precise definition of these and similar terms, see Harris (2013, p. 12).

41 Teichler (2000a) has also identified other analytic typologies of higher education differentiation, such as: sectors vs. spectrum; vertical status dimensions vs. horizontal substantive dimensions; and inter-institutional vs. intra-institutional.

prevailing type of institution, usually the traditional university. For example, Italy continues to rely on a system of universities as the only institutional type. Diversified systems include a wide range of models composed of two (i.e., binary systems) or more types of higher education institutions, including universities, technological institutes, or professional-oriented institutions, among others.[42]

Based on informal vertical differences, there is a common distinction between 'first-tier' and 'lower-tier' institutions. The former corresponds to the traditional research university – which often stands at the top of the higher education system – defined as "academic institutions committed to the creation and dissemination of knowledge in a range of disciplines and fields and featuring the appropriate laboratories, libraries, and other infrastructures that permit teaching and research at the highest possible level" (Altbach & Balán, 2007, p. 1). Following the Humboldtian model of university,[43] these institutions are characterized by the combination of research and teaching, and composed by full-time academic staff with doctoral degrees. They are generally more selective in student admissions and faculty hiring.[44] By contrast, short-cycle, vocational, or professional institutes emerged in Europe since the 1960s with prototypical models such as: the *Polytechnics* in Britain, the *Institutes Universitaires de Technologie* in France, and the *Fachhochschulen* in Germany.

A related concept to the process of institutional differentiation has been called the "academic drift" phenomenon (Neave, 1979). It refers to the process where less prestigious higher education institutions (lower-tier institutions) try to raise their status by becoming more similar to the patterns and characteristics of the selective universities (first-tier universities). An analysis on the academic drift as a main cause of the current trend towards institutional homogenization within

42 Although in some countries differentiation in higher education is not given to different institutional typologies but to differences of levels or length of the study programs.

43 Wilhelm von Humboldt introduced the revolutionary idea of modern research university with the establishment of the University of Berlin in 1818. Two main contributions of his idea are worth mentioning: (i) the synergy between teaching and scientific research, and (ii) the organization of a 'chair' system by discipline-based professors.

44 With the growing use of rankings towards excellence standards in higher education, the term 'world-class' universities (or first tier institutions) has become popular worldwide, as opposed to the 'second class' (or lower-tier) institutions. However, Altbach (2004, p. 5) points out: "Everyone wants a world-class university. No country feels it can do without one. The problem is that no one knows what a world-class university is, and no one has figured out how to get one. Everyone, however, refers to the concept".

higher education systems is carried out by Harris (2013). This phenomenon will be briefly discussed for the case of the Colombian higher education system in Chapter 5.

3.4.2 Studies on Expansion and Stratification in Higher Education

A considerable amount of literature within the higher education field has conducted intense debates concerning the desirable size, shape, and the driving forces of quantitative and structural developments of higher education systems. A group of studies in this line have focused on the analysis about the consequences of the systems' structural variations on social stratification. In the following, some conceptual issues developed in the framework of these studies will be commented, paying special attention to the impact of expansion and institutional differentiation on inclusion and access to higher education of individuals from different social origin.

Expansion and Stratification

As a result of the rapid growth of national education systems, the provision of higher education has been expanded for a wider range of social groups. A key question is whether educational expansion provides more opportunities for individuals from underprivileged origin, or conversely magnifies inequality by distributing opportunities unequally in the attainment of higher qualifications and subsequent professional positions. This constitutes an old question, already posed by sociologists of intergenerational social mobility in the late 1960s. In the literature, scholars in this tradition have sought to examine whether attainment at higher levels of education is still dependent of social origin under macro-structural changes, such as educational expansion. Nevertheless, "old questions often remain relevant over time or become significant again in changing contexts", as it is the case with the strong expansion wave of higher education systems since the 1990s (Wolter, 2009, p. 4).

Overall, the ideas of human capital, learning society, and lifelong learning had led to the idea that expanded access to higher education is a "win-win situation" for both individuals and societies (Ramirez, 2006, p. 437), as educational expansion is associated with many advantages, including enhancement of individuals' well-being and of societies' macroeconomic development. Particularly, supporters of human capital theory try to provide empirical evidence on the link between higher participation in education and economic growth. Yet, scholars

from other perspectives have observed that this is not a universal finding and suggested that educational expansion in and of itself does not reduce educational inequalities associated with social origin – at least for the highest educational levels (e.g., Baldwin & James, 2010; Boliver, 2011; Hadjar & Becker, 2009; Raftery & Hout, 1993; Shavit, Arum et al., 2007; Shavit & Blossfeld, 1993). On the whole, the most recent studies have produced empirical evidence which seems to be context-dependent, as summarized by Barone (2009): declining inequalities in Scandinavian nations, stable or increasing inequalities in Eastern Europe and Anglo-Saxon countries, and mixed results for Western Europe. Germany, for instance, is a well-documented national case, in which educational inequalities seem to have decreased with the expansion but not entirely abolished (Becker, 2003). In Latin America, Torche (2005) has shown empirically for the case of Chile that inequality of educational attainment has not been found only to persist but to increase.

One of the assumptions about the expected and desired consequences of educational expansion[45] is the widespread idea that it plays a key role in the increasing, widening, and heterogeneity of the student body. This concept has introduced debates around *inclusion* and massive expansion of higher education in two aspects: on one hand, the emphasis is put not only on how much the higher education system has grown, but how diverse its student composition is; and on the other hand, it raises questions about what counts as knowledge and what is taught in higher education institutions.[46]

The former aspect points to the idea that higher education growth leads to a more heterogeneous student composition, in terms of gender, family background, abilities, or expectations. The participation of under-represented social groups in higher education is closely related to policy goals of inclusion by opening up educational provision to *non-traditional students*[47] such as mature, employed,

45 Hadjar and Becker (2009) distinguish between expected, unexpected, desired, and undesired consequences of educational expansion. Persistent inequalities are both undesired and unexpected. By contrast, desired and expected consequences of expansion include: a reduction of inequality of educational opportunities, an increase of more highly educated people, and growth in economic wealth.

46 The latter aspect has to do with what Ramirez (2006, p. 443) has called "valorized diversity", regarding the changes in the meanings of university and university graduates in credential societies, by introducing the issue of *curricular diversification*.

47 There is no unique definition of non-traditional students in higher education. According to their origins and aspirations, they are defined by Trow (2000, p. 1) as those who are oriented towards gaining skills and knowledge rather than acquiring their membership in a cultural elite based on "certain ways of thinking and perceiving". Nevertheless, Wolter (2013) points out that the term can be defined based

part-time or vocational-oriented students. Other characteristics that typically are attributed to the heterogeneity of the higher education student composition are: migration status, students with children, disabled individuals, or internationally mobile students, among others.

Although substantial progress has been made towards a more inclusive higher education through expansion, empirical evidence does not show optimistic results. For instance, in a comparative exercise among European countries, Wolter (2013) found a weak correlation between expansion and 'heterogenization' of students. The rise in enrollment of first-year students is directly linked to a high share of non-traditional students in some countries (e.g., Britain, Finland, Portugal, and Sweden). However, "in almost all countries growth in participation has not been accompanied by a process of social inclusion or only by a very modest process of social opening" (Wolter, 2013, p. 22). For the German case, the author finds a low degree of heterogeneity despite the system's growth, and concludes that massification does not necessarily imply diversity.

In short, how to explain the rapid expansion of mass higher education with a pattern of extreme and persistent social inequality in a given country? According to Pritchett (2001), expansion of national education systems in the last decades seems to be uncorrelated to economic growth as well as to inequality reduction. Among the possible explanations for this, one is particularly worth mentioning: it could be the case that educational quality is often too low so that it has no impact on inequality.[48] This aspect leads us to the next point related to institutional differentiation and quality issues.

Institutional Differentiation and Stratification

It has been argued that the emergence of diverse types of higher education institutions is a result of the expansion process. As national education systems expand, traditional universities grow, and new types of institutions emerge to serve

on either one or several of the following criteria: age, belonging to under-represented groups, learning through other study modes (e.g., distance or part-time), access to higher education through alternative routes – or winding paths.

48 The author identifies two other explanations for the persistent inequalities in some countries despite educational expansion: (i) the existence of ingrained patterns of social exclusion and discrimination within institutions, which in turn affects educational outcomes, since the "social payoff of education depends on other institutions in society" (De Ferranti et al., 2003, p. 187); and (ii) when there is a mismatch between supply and demand in the labor market, economic wealth cannot be increased by merely expanding education.

larger numbers of students and provide higher education for a more divergent demand (Altbach, 1999), offering a much broader array of programs, courses, degrees, and possibilities of training in order to meet the various needs, expectations, and abilities of the new student body.

Although expansion and differentiation have increased opportunities for students from underprivileged origins to enroll at advanced educational levels, higher education systems have become "hierarchically differentiated so that these new opportunities may have had diminished value" (Shavit, Arum et al., 2007, p. 1). Even though the formal dimensions of institutional differentiation are 'neutral', *social segregation* is produced when this differentiation is related to a selective participation of social groups, particularly when diverse institutional types are associated with dissimilar degrees of quality, status, content, and graduate careers. Thus, highly-differentiated higher education systems may be reinforcing social stratification in terms of access to a certain type of institution or program level, as non-traditional students are usually absorbed by the less selective institutions. Although the recognition of these informal or hidden dimensions of differentiation (Teichler, 2004) and their impact on educational inequalities has been widely analyzed at the level of higher education, some works on social inequalities at secondary education have gradually also incorporated this notion (e.g., Blossfeld et al., 2016). Indeed, institutional differentiation in education started with the diversification of secondary school curricula in modern societies, and while acknowledged, it has been partially and superficially studied (Benavot, 2006) by drawing attention to the classic divide general/academic vs. technical/vocational and rarely considering other dimensions.

The topic of institutional differentiation undoubtedly leads to the inquiry about the existence of *horizontal educational inequalities* (Ayalon & Shavit, 2004; Gerber & Cheung, 2008; Lucas, 2001; Torche, 2005). As the level of education has an impact on the individual's academic and occupational outcomes (vertical inequalities), so does the type of education received within a certain level (horizontal inequalities), such as field of study, type of institution, cost, intensity, and timing of study. The role of school quality on educational inequalities has a long history in educational research on secondary school, as seen earlier in this chapter. At the higher education level, the study on quality issues and its impact on IEO is a promising research line. Although Clark (1960) was one of the first scholars to point out that broadening access makes high quality education a privilege for a few, over the past three decades abundant literature has discussed the tension between expansion and quality.

To date, numerous studies have provided empirical evidence on horizontal inequalities at higher education in two main ways (Gerber & Cheung, 2008). First, the influence of individual's social background on the relationship between qualitative characteristics of the kind of higher education attained (e.g., institutional type, field of study, degree, etc.) (Ayalon, Grodsky, Gamoran, & Yogev, 2008; Davies & Guppy, 1997; Davies & Zarifa, 2012; Gerber & Schaefer, 2004; Goyette & Mullen, 2006; Karen, 2002; Mullen et al., 2003; Mullen, 2009; Reimer & Pollak, 2010). Regarding institutional selectivity, Torche (2011) has pointed out that the association between social origin and attaining a selective university is largely, but not only, mediated by academic achievement. Second, there is a well-established association between qualitative differences in higher education and differential labor market returns for university-degree holders.[49] There is large evidence on the higher economic returns among higher education graduates from selective institutions and prestigious fields of study. Considering the O-E-D triangle, while the former point refers to the O-E association, the latter is associated with the E-D link.

The consequences of the highly differentiated higher education systems for social stratification have been the object of study of several works in developed nations. The literature in comparative higher education has also studied how dissimilar degrees of institutional diversification of higher education systems produce differential outcomes in terms of enrollment, graduation, and student composition. For instance, the comparative findings of Shavit, Arum, and Gamoran (2007) indicate that access to upper-tier higher education institutions remains largely determined by social background over the years in the countries examined. However, the authors argue – giving a more moderate idea than the persistent inequality found by precedent works (Shavit & Blossfeld, 1993) – that expansion promotes inclusion by extending higher education to a broader spectrum of the population. This inclusion, they suggest, occurs under certain conditions, one of which is the extent of the system's diversification: more diversified systems (e.g., Korea, Japan or Sweden) tend to be more inclusive than binary systems composed of first-tier and lower-tier institutions (e.g., Britain, France, Germany or Netherlands).

Another important dimension along which higher education systems vary is the extent to which expansion occurs through private financing or public sources. The inability of governments to fully fund universal higher education has led to a process of privatization (Baldwin & James, 2010), which can take different

49 A summary of empirical findings of various measures of college quality, field of study and earnings is in Gerber and Cheung (2008).

forms and various degrees depending on the national contexts. The public/private funding in higher education has been a matter of great interest among scholars since the mid-1980s, due to the emergence of multiple private providers at this educational level worldwide. In particular, the origin and expansion of private higher education has usually been regarded as a factor of institutional differentiation for two main reasons: first, diversified higher education systems consist of a set of institutions with varied roles and different funding patterns; and second, there is more heterogeneity among institutions within the private sector than in the public sector, in terms of finance but also according to institutional mission, governance, and administration (Bernasconi, 2006).[50] This is a relevant dimension in the analysis of institutional differentiation, as private institutions typically act like "client-seekers" in attracting well-defined groups of students as potential clients, as opposed to the "status-seekers" institutions, which intend to enhance their prestige by attracting high-skilled staff and students (Shavit, Arum et al., 2007, p. 7). While the former implies low admissions processes, the latter elevate their criteria. As a result, market-based systems likely result in a rapid and large expansion, but through charging tuition fees that may obstruct attendance by individuals from low-income households.

3.5 On the Importance of Theoretical Grounding in the Empirical Research on IEO

An old but still prevailing question around the phenomenon of inequality of opportunities is: why do some people end up with 'better' or 'more' educational and occupational outcomes than others? As exposed throughout this chapter, multiple analysts from different perspectives have documented the association between socio-demographic factors and individual's outcomes. Children from disadvantaged backgrounds typically obtain lower education attainment, lower academic performance, inferior earnings, and/or low-prestige occupations in comparison to their more advantaged peers. Nevertheless, research on IEO still

50 In the field of higher education research, various classificatory schemes of private higher education institutions have been proposed. For instance, Levy (2011) identifies three main causes of the expansion of private higher education: religion, social advantage, and absorption of the accelerated demand for higher education. From another perspective, Bernasconi (2006) indicates that part of the institutional differentiation emerges from the existence (or lack) of an affiliation of private institutions with other organizations, which do not necessarily belong to the educational field (e.g., religious communities, military bodies or business corporations).

has the task to disentangle the underlying mechanisms to that association. Moreover, when it comes to the question about the trends of IEO across time and place, the empirical evidence is still not conclusive.

Most importantly, although much has been advanced over the last years in terms of methodological tools to produce valid and reliable measures of IEO, the analysis of inequality of opportunities – or social mobility in general – is "empirically strong but theoretically weaker" (Torche, 2015, p. 364). Similar criticisms have been posed to the international large-scale assessment studies (e.g., PISA). While these studies have considerably advanced our understanding of factors associated with student outcomes by providing extensive empirical evidence, their incapacity of building on theoretical perspectives is often called into question. To this regard, Caro, Sandoval-Hernández, and Lüdtke (2014, p. 433) indicate that "the extended use of indicators poorly grounded in theory", like socioeconomic status or school climate, "prevent the study of mechanisms underlying associations with student outcomes". Overall, the topic of IEO has lacked a robust and articulated theoretical foundation, especially on the construction of well-defined constructs. As by itself, empirical research offers little to social analysts and policymakers, "empirical analyses need become more theory laden if any progress on informing policy is to be realized" (Lucas & Beresford, 2010, p. 26). Next chapter intends to provide a theoretical basis for the study of the mechanisms and trends of IEO.

4 Theoretical Approaches to the Mechanisms and Trends of Educational Inequalities

It is possible, now, to introduce a group of theoretical approaches derived from the previously-exposed empirical traditions. Instead of trying to reach a theoretical consistency among those traditions, I offer a comprehensive approach for undertaking the research questions of this study on educational inequalities in Colombia. The purpose here, however, is not to test the hypotheses derived from the different research traditions. Instead, the theoretical perspectives presented will be used as potential explanations and as a basis on which to discuss the empirical findings.

The chapter is divided into four sections. The first one begins by presenting the theoretical approaches to the mechanisms underlying inequalities in academic achievement. The second part deals with those approaches to the mechanisms behind inequalities in educational choices. The third part presents the main theoretical approaches to the trends of the overall O-E-D association. Lastly, the fourth section summarizes two contrasting views: equalization of opportunities versus persistence of inequalities.

4.1 Mechanisms Underlying Academic Achievement

Academic achievement is understood as the result of a complex interaction between the role of educational institutions, on the one hand, and the cultural, economic, and social resources of individuals and their families, on the other. As far as the former is concerned, the EER tradition has produced a vast literature on the school factors influencing student performance. Regarding the latter, different kinds of mechanisms that might account for the variance in academic achievement between groups have been identified (Erikson & Jonsson, 1996b; Jackson, 2013b): (i) genetic factors; (ii) health and nutrition; (iii) psychological factors; (iv) the economic, cultural, and social resources of the household; and (v) family structure and socialization. Leaving the genetic factors aside,[51] social scientists aim at determining the role of these mechanisms on the creation of

51 The book entitled *The Bell Curve* (Herrnstein & Murray, 1996) is perhaps the best-known example of the literature supporting genetic explanations of differences in performance. The main argument of this approach is that individual's intelligence, as a genetic capacity, determines her or his educational and occupational outcomes.

inequalities in achievement. In particular, educational sociologists have been interested in disentangling how the family's economic, cultural, and social conditions shape the individual's educational outcomes.

From the group of mechanisms mentioned above, two major contrasting approaches have been derived. On the one hand, the 'educational approach', as it labelled here, supports the idea that education is the *great equalizer*,[52] in other words, school makes a difference. On the other hand, the sociological approach supports the idea of persistent inequalities, that is, schools do not matter. Whereas the former, best represented by the perspective of educational effectiveness, sustain that educational institutions add value to the outcomes obtained by disadvantaged individuals, the latter maintain that inequalities are reproduced despite the role of education systems.

4.1.1 The Educational Effectiveness Approach

The idea that school makes a difference, held by exponents of the EER, has attracted considerable support among practitioners and policy makers. Its literature is characterized by being empirically oriented, and largely driven to counterbalance the findings by Coleman and Jencks on the limited role of schools for social mobility. Although this tradition has contributed enormously to providing empirical evidence to identify and measure those school and instructional effects relevant for student achievement, it also faces an important number of external criticisms, some of which are summarized in the following paragraphs.

First of all, the comprehensive model input-process-context-output employs a simple additive model of educational effectiveness, within which researchers introduce different variables in the input to see *what works* in the output (Angus, 1993) – or the more recent variant: *what works best* for both students and teachers (Hattie, 2008). While the selection of inputs has often been guided by data availability, educational processes are seen just as a set of 'throughput' factors. Critics frequently question the way how this perspective treats schools as institutions detached from social context that are functional in educating students regardless

52 Over the 1840s, Horace Mann, the first State Secretary of Education in the United States, referred to mandatory public education as the "great equalizer" of human conditions and "the balance wheel of social machinery". This expression has been mainly connected with the central tenet of the North American ideology of equal opportunity, according to which "achievement is not predicated on the luck of being born into a wealthy family; rather anyone can get ahead through hard work and persistence" (Mullen, 2010, p. 3).

of their backgrounds. It has been also questioned that the model does not recognize the stratified character of educational institutions or the fact that there is a hierarchy of schools that produce social segregation among students.

A second unsolved problem is perhaps one of the strongest critiques of EER: the absence of a theoretical framework. These studies produce lists of effective factors that are mere generalizations of empirical results, but they are not theories of school effectiveness because, on the one hand, they are formulated at a low level of abstraction (i.e., they are 'empirical factors' but not 'theoretical concepts'), and on the other, they do not account for mechanisms that may explain the impact of these factors on learning outcomes (Blanco, 2009a). Even though some authors mention theoretical references in their studies, these usually are within the framework of organizational theories (e.g., systemic theories, human capital theory, managerial theories, etc.), which shed limited insights on educational processes. On this subject, many critics have claimed that EER seems a more pragmatic policy-oriented field than a theoretically relevant body of literature, which is "socially and politically decontextualized" (Thrupp, 2001, p. 7). Indeed, both promoters and opponents of the use of international surveys on student achievement concur that there is a lack of theory behind the research agenda and that they rely more on common sense and mere statistical criteria, "without considering the theories available in education and other disciplines" (Caro et al., 2014, p. 434). Even some proponents of EER (e.g., Creemers, 2002) have already accepted the theoretical limitations:

> Most of the studies on educational effectiveness are atheoretical and are concerned with the establishment of statistical relationships between variables rather than with the generation and testing of theories which could explain those relationships and contribute to the establishment of strategies for improving educational effectiveness (p. 4).

A third criticism indicates that most EER studies do not give emphasis to student socioeconomic background under the assumption that schools "do not just make *a* difference, but they make *all* the difference" (Reynolds, 1995, p. 59 emphasis in original). In some studies, social origin is assumed to be just a variable that needs to be controlled and not a relevant independent variable: "Family background, social class, any notion of context, are typically regarded as 'noise'– as 'outside' background factors which must be controlled for and then stripped away so that the researcher can concentrate on the important domain of school factors." (Angus, 1993, p. 341).

Finally, it is worthwhile noting that despite the great deal of research activity within the EER studies, no consensus exist as to the source and magnitude of school effects consistently associated with student achievement: "We are not suggesting that nothing makes a difference, or that nothing 'works'. Rather, we are saying that research has found nothing that consistently and unambiguously makes a difference in student outcomes." (Averch, Carroll, Donaldson, Kiesling, & Pincus, 1971, x).

What has been early envisioned by Averch et al. (1971) was later confirmed by many meta-analyses. For example, the review of 147 studies by Hanushek (1986) did not find any systematic pattern of the effect of different school factors (e.g., class size, teacher/pupil ratio, and teacher's salary, education, and experience) on achievement. What he did found was a positive correlation between expenditure per pupil and academic achievement, which nonetheless disappeared when family background was controlled. On this point, Ramirez (2006) adds that despite the disagreements around the effects of school expenditures, most findings seem to be compatible with the assumption that how resources are allocated is more important than how much is spent.

More recent reviews have identified a group of consisting findings that can be condensed in the following four points, most of them extracted from Ramirez (2006). First, the single most important predictor of academic achievement is the family's socioeconomic condition, which seems to be a constant across countries. However, how household resources are employed for fostering student performance varies across national school systems.[53] Moreover, measures of individual's cognitive ability have strong positive effects on performance, but they also tend to be highly correlated with family background variables. Second, the school's socioeconomic composition has a positive effect on outcomes but it is not stronger than the effect of individual's social origin. Third, favorable institutional factors, such as good school climate and a reduced class size, influence positively student achievement, net of other factors. Lastly, within-school effects

53 An existing related debate in comparative research resides in the differences between developed and less developed countries. Whereas in the former countries, the size of the school effects is very small, in the latter countries, school variables seem to have a major effect (Teddlie & Reynolds, 2000). As to this point, Heyneman and Loxley (1983) had suggested that achievement gaps in the poorest countries are largely due to the quality of the educational institutions attended than to the student composition. Nevertheless, recent evidence indicate that social origin has also become more important in developing countries. One interpretation of this rise might be the tendency of schools in becoming more similar, while differences in socioeconomic conditions among families remain (Ramirez, 2006).

on achievement tend to be stronger than those between schools. Separation in tracks, associated with differences in curriculum and pedagogies, has been found to be the most important variable within schools and to have a cumulative negative effect: students in lower tracks perform low and when staying longer their outcomes get worse.

4.1.2 Reproduction Theories and Academic Achievement

According to the ideal of equal opportunities in democratic societies, education systems are supposed to level the playing field between students in a way that no inequalities occur based on ascribed characteristics. Sociology of education has showed that such is not the case (Duru-Bellat, 2015). In particular, the sociological approach to explaining the phenomenon of inequalities in achievement has mostly focused on assessing the relative importance of the family's financial, educational, cultural, and social resources that fully explain the association between family's characteristics and children's academic performance. *Reproduction theories* have been the most used theoretical framework to account for this association. Although the mechanisms highlighted by reproduction theories vary, they tend to emphasize the cultural dimension, through concepts such as cultural capital, socialization, or language codes (Torche, 2005).

In his seminal work, French sociologist Pierre Bourdieu (with Passeron 1964, 1977) developed the widely recognized cultural reproduction theory. In general terms, it points out that educational outcomes of students depend on the family's amount and composition of different forms of *capital*, and on the extent to which these forms are aligned with the culture legitimated and promoted by education systems. In this theory, the concepts of *economic capital* and *cultural capital* are of special relevance.[54] Economic capital include income, assets, and economic resources in the household. It is assumed that the greater the family's economic capital, the better the physical conditions supporting the learning processes and cognitive development of its family members, and thus higher educational outcomes. As for cultural capital, Bourdieu distinguishes three forms: *objectified* (i.e., cultural assets, such as books, instruments, didactic materials, etc.), *institutionalized* (i.e., educational credentials), and *embodied* (i.e., symbolic disposi-

54 Although Bourdieu introduced other categories of capital into the analysis (e.g., *symbolic capital*), they will not be discussed here for reasons of space and relevance for the present study.

tions, preferences, values, and tastes called *habitus*). The latter include participation in cultural practices like theatre or museum exhibitions, use of specific linguistic codes, and the possession of certain educational values and aspirations.

From this perspective, the unequal distribution of cultural capital among social classes is what explains educational inequalities. In other words, the accumulation of family's cultural capital, which is assumed to be highly associated with the family's economic capital, strongly influences the student's educational outcomes and trajectories. Accordingly, students from advantaged origins strategically use their *inherited* cultural capital to get successful educational outcomes (i.e., *scholastic* cultural capital) in line with the institutionalized standards of evaluation used by the education system.

Another reproduction theory is the one proposed by British sociologist Basil Bernstein (1971) based on *language codes*. The author argues that the pedagogical discourse privileges certain types of symbolic production, which are generated via social position. Accordingly, children from different social backgrounds develop different forms of communication during their lives, which in turn have an impact on their educational outcomes.

The main argument of reproduction theories is that students from privileged social backgrounds – the 'inheritors' – are naturally adapted into the dominant culture, so that they succeed in the formal education system because teachers judge and assess them based on implicit criteria taken from that culture. On the contrary, students who do not come from advantageous backgrounds have difficulties to overcome the challenges posed by the system, whose norms, codes, and criteria are not familiar to them.

Despite the wide acceptance of reproduction theories among a large group of scholars – especially those that maintain a critical perspective on the role of national education systems[55]– some limitations need to be mentioned. First, reproduction theories have generated an enormous amount of literature, yet without producing sufficient empirical evidence (Blanco, 2016). In particular, Bourdieu did not provide much quantitative support on how the reproduction of cultural capital occurs.[56] A related issue is that the concept of cultural capital itself was originally introduced at a high level of abstraction, to the extent that it has been considered as a broad and nebulous concept (Goldthorpe, 2007a), and has led to

55 Reproduction theory enjoys tremendous popularity in the Latin American region (e.g., Tenti, 2005; Blanco, 2011; Fernández, 2004).

56 On this subject, Bernstein's theory has been regarded as a more explicit theory (Blanco, 2011, p. 167).

multiple – and sometimes inconsistent – definitions, interpretations, measures, and usage.

Second, following the criticisms by Blanco (2009b), educational outcomes cannot be solely explained by differences among social positions of individuals. Contrary to the expectations from the reproduction perspective, there are schools that in fact achieve high academic performance by students from low-income families. In this regard, one of the main interests of the EER, and particularly of value-added studies, relies in producing evidence on the conditions under which schools play a decisive role to counteract the effect of social origin.

Moreover, since Bourdieu's reproduction theory was formulated in the historical and institutional context of the French education system, it is not clear how this theory would be applied to the current rapid expansion of education systems (Canales, 2013). Actually, arguing the existence of a homogeneous cultural background is difficult to hold in the case of other education systems, particularly in unequal societies, where expansion has led to wide diversity. According to Tenti (2007, cited by Blanco, 2009b, p. 1022), the heterogeneous nature of the education system is indeed what makes social reproduction to persist, as systems tend to be socially segregated in tune with the existing inequalities in the social context. One of the most salient expressions of such a segregation lies in the coexistence of disproportionate differences in both quantitative resources and qualitative characteristics among schools.

Finally, some critics have pointed out that most empirical work on social stratification widely disregards individual-level variables, like 'natural' intelligence or cognitive ability, but also aspects such as: work ethic, observed effort, perceived control, self-efficacy, etc. On this matter, Duru-Bellat (2015) asserts that reproduction sociologists have often neglected the possibility that the achievement gap may also be result of differences in cognitive skills before children enter the education system. Although the literature has distinguished between cultural capital and cognitive ability – for example, Jæger (2009, pp. 1946–1949) maintains that whereas cultural capital is about "knowing the rules of the game", academic ability is about "being smart" – the boundaries between the two are not always clear. Other authors suggest that there is also a problem of abstractionism in explanations from the reproduction perspective, as argued by Marks (2014, p. 154): "cultural capital theory accounts for any aspect of social life that relates to student performance". Moreover, one could speculate that high-ability individuals are likely to attain more schooling years than low-ability peers, but the former also tend to earn more than the latter after controlling by education (Eide & Showalter, 2010), which makes it difficult to separate the

effect of education (or institutionalized cultural capital) from that of ability. Despite the apparent circularity and shortcomings of these arguments, there is steady evidence that the effect of family social background remains strong on achievement, net of a range of measures of cognitive ability (Sørensen, 2006) – a result that has been found in the PISA studies. In short, although cognitive ability shows strong positive effects, it tends to be highly correlated with social origin variables. Also, social origin may also have an indirect effect on educational outcomes through cultural resources at home and parental involvement in the children's learning activities. Still, the research on the role of individual's agency in the intergenerational transmission of education is a promising area that deserves to be further developed. Recent studies (e.g., Burger & Walk, 2016) indicate a weak association between children's agency and social class and the existence of a positive effect between agency and educational achievement, which raises relevant questions to the debate about social structure vs. human agency.

4.2 Mechanisms Underlying Educational Choices

Beyond differences on achievement between socioeconomic groups, another way to assess educational inequalities is in the extent to which these inequalities are attributed to differences in the educational choices made by students and their families. Two major approaches on the topic of educational decisions are examined: the economic approach on the one hand, and the sociological approach on the other. The economic approach is above all represented by the *human capital theory,* based on the main assumption that education is the source of economic development. Sociological theories on educational inequalities are numerous, but general explanations around educational choices can be divided into two groups: 'rationalists' and 'structuralists' (Blanco, 2014b), being the former associated with the *rational choice theory* and the latter with the *cultural reproduction theory.*

4.2.1 The Human Capital Theory

Human capital represents the basis for most of the empirical work in the economics of education (Eide & Showalter, 2010). Drawn on Adam Smith and Alfred Marshall's fundamental ideas, human capital is defined as the productive capability of human beings and a fundamental source of wealth. The emerging threads of theoretical and empirical work (established by Becker, 1964; Mincer,

1974; Schultz, 1960) consider that education is the source of economic development. According to this assumption, an individual decides to invest in education with the expectation that he or she will maximize his or her capabilities in the form of earnings and overall wellbeing. Under this perspective, individuals and their families are assumed to make educational decisions (e.g., as to making or not certain transitions, choosing certain tracks, programs or institutions over others, etc.) on the basis of a cost/benefit evaluation. Investing in advanced education is thus undertaken if the benefits perceived by the individuals exceed the expected costs.[57] The argument of educational investment presupposes that parental economic resources constitute an asset of central importance for the children's educational opportunities. By using their economic resources, affluent parents might tend to secure for their children the best options within the structure of the education system. In turn, educational qualifications provide them with skills and knowledge that, via participation in the labor market, might reduce social inequalities.

One of the most prolific empirical developments based on this theoretical perspective has been the measurement of the returns to education, that is, the E-D association. In addition, the economic theory has also been widely used for analyzing educational decisions of continuing post-secondary education. Nevertheless, it has been often criticized for considering outcomes in merely monetary terms, as investment or utility, thus disregarding non-monetary aspects of education. Most importantly, a central limitation of the economic theory for a comprehensive understanding of educational outcomes resides in that it overlooks how students' background may affect their educational decisions in relation to expectations about income or to perception of the labor market opportunities (Canales, 2013).

4.2.2 The Rational Choice Theory

Whereas the economic perspective focuses on cost/benefit evaluations independent of socioeconomic background, the sociological approaches emphasize the social mechanisms that produce group differences in educational choices. In these approaches, two main theories can be identified: the *rational choice theory* and the *cultural reproduction theory.* While the rational choice theory considers

57 Costs can be direct or indirect. The former include tuition fees, transportation, accommodation, books, materials, etc. Indirect costs may include non-monetary costs, forgone earnings, and unemployment (i.e., opportunity costs) (Canales, 2013).

an evaluation process of costs and probabilities of success conditional on individual's performance; the cultural reproduction theory stresses the family cultural norms and values that shape educational aspirations and choices. Derived from the more general concept of 'rational action', the *rational choice theory* maintains that variations in educational outcomes of individuals from different social origin can be explained by the interplay between *primary effects* and *secondary effects.* The former refer to the impact of social origin on academic performance, whereas the latter refer to the influence of social background on educational choices and ambitions, net of student's performance. The distinction between primary and secondary effects[58] was originally established by Raymond Boudon in his book *Education, Opportunity, and Social Inequality* (1974),[59] within the framework of his general understanding of inequality of educational opportunities.

One approach within this theory argues that variations in educational outcomes associated with social origin are due to the *relative risk aversion* (RRA) behavior (Breen & Goldthorpe, 1997; Goldthorpe, 1996). The central research question undertaken in this perspective is to what extent IEO is attributed to differences on achievement between socioeconomic groups or to differences on the choices made by students and their families, net of performance. The concept of RRA explains social class' educational differences in terms of (rational) educational decisions that individuals and their families make to avoid downward mobility – or at least to maintain the parental class position – by means of three evaluation criteria: the costs of educational tracks/paths/programs according to the financial resources of families, the potential benefits associated with those choices, and the probabilities of success regarding the own academic performance.

In recent years, a group of empirical studies, mostly conducted in European countries (e.g., Breen & Yaish, 2006; Holm & Jæger, 2008; Stocké, 2007; van de Werfhorst, 2002; van de Werfhorst & Hofstede, 2007), have revived this approach with the introduction of new methodological tools, by considering both

58 It is to be noted that primary and secondary effects have been derived from basic statistical concepts that are equivalent to indirect and direct effect of social origin on educational attainment (Blau & Duncan, 1967), respectively.

59 Originally published in French under the title *L'inegalité des Chances* in 1973. The terms primary and secondary effects, however, were introduced by other French sociologists (Girard & Bastide, 1963) ten years before. For a critical review on Boudon's theory, see Hauser (1976) and the following reply to it by Boudon (1976).

achievement and educational choices simultaneously. A cross-national comparative study (Jackson, 2013a) has shown that, despite variations in the magnitude of the effects, the relative impact of primary and secondary effects is a common pattern in developed nations. Findings also suggest that the effects of choices are higher than those related to achievement. In other words, variances in educational outcomes among groups with diverse social origin does not seem to depend primarily on student performance, but on the disparities in educational decisions.

The interpretation of these results is that students from different social backgrounds differ in their RRA behavior. Children from disadvantaged social origin tend to choose less education or less-demanding tracks that limit their future outcomes, regardless of their academic achievement. Conversely, children coming from affluent households usually take longer, more ambitious and high-return educational options in order to reach at least the same social position as that of their parents, even if their performance in academic assessments is not optimal: "Children from more advantaged class origins who do not do well educationally have other resources available to them to protect them against downward mobility – resources that reflect their social background rather than their individual achievements" (Goldthorpe, 2003, p. 239). On the contrary, children of less advantaged origins need to show 'more' merit than their more advantaged counterparts in order to achieve similar outcomes (Breen & Goldthorpe, 2001).

As discussed by van de Werfhorst (2014), the rational choice theory has not been well received among economists, to the extent that some of them call for its abandonment (e.g., Cameron & Heckman, 1998). Whereas sociological scholars argue that families or individuals themselves make educational decisions in a short-sighted manner, economists suggest that these decisions are made in anticipation of the educational transition, by considering all options with full information at hand. In that regard, some authors (e.g., Lucas, 2001) have empirically shown how well-informed and anticipated educational decisions are more frequently found among privileged children than among their disadvantaged counterparts; the latter tend to be 'myopic' in the construction of their career paths.

Contrary to the human capital theory that assumes educational decisions as guided exclusively by calculations on returns, the rationality guiding educational choices from the RRA perspective goes beyond monetary aspects. Despite its contributions to a more comprehensive understanding of IEO, an important limitation of the RRA hypothesis is that variations in educational aspirations are reduced to class differences in socioeconomic resources. As pointed out by Canales (2013, p. 20), "aspirations or ambitions of students from different backgrounds do not reflect solely economic conditions and constraints but also norms

and other aspects", which in turn could be linked to family's cultural resources. Another limitation of this theoretical approach identified by Blanco (2014a) refers to its failure to consider that educational decisions also depend on the institutional arrangements of education systems.

4.2.3 Reproduction Theories and Educational Choice

Instead of resorting to rational choices, the reproduction theory argues that values, tastes, and aspirations develop differently by social class. The unequal endowment of cultural capital exhibited by individuals from different social groups, as well as their various degrees of familiarity with the dominant linguistic and cultural competencies in society, account for differences in understanding the structure of the education system and of ways of how to navigate it. In Bourdieu's (1998) words:

> Social agents, students choosing an educational track or discipline, families choosing an institution for their children, and so on, are not particles subject to mechanical forces and acting under the constraint of causes; nor are they conscious and knowing subjects acting with full knowledge of the facts, as the champions of *rational action theory* believe.… In fact, "subjects" are active and knowing agents endowed with a practical sense, that is, an acquired system of preferences, of principles of vision and division (what is usually called taste), and also a system of durable cognitive structures (which are essentially the product of the internalization of objective structures) and of schemes of action which orient the perception of the situation and the appropriate response. The habitus is this kind of practical sense for what is to be done in a given situation (pp. 24–25).

There is a great body of empirical work, from both qualitative and quantitative perspectives, that shows how highly-educated parents help students to understand better the requirements and hierarchical organization of education systems. Consequently, individuals from different social origin tend to differ in their educational choices. Furthermore, since education is widely perceived as being open to all on the basis of ability and effort, educational credentials play a role in the reproduction and legitimation of social inequalities. As stated by Duru-Bellat (2015):

> Many working-class children come to see themselves as intellectually inferior; they accept that they, rather than the system itself, are to blame for their failure. In this way, the education system plays a key role in the cultural reproduction of social inequalities; educational credentials help to reproduce and legitimize social inequalities, and at the same time higher class individuals are seen as deserving of their place in the social structure (p. 327).

Despite cultural capital and rational choice have been often put as opposite theoretical frameworks (Goldthorpe, 1996), some authors claim that actually they are not contradictory at all but complementary (e.g., Cardona & Diewald, 2014; Tarabini & Curran, 2015). Moreover, further empirical studies have proposed alternative mechanisms to account for educational decisions on the basis of factors beyond social background conditions, such as, organizational issues of schools, life course's events, the relationship between the education system and the labor market, among others.

4.3 Trends of the O-E-D Association

One important finding within intergenerational mobility studies is the key role of education in determining individual's life chances, as a mediator in the relationship between social origin and destination. Even though this research tradition has not been particularly focused on the role of education per se, they have contributed significantly to the study of educational inequalities. Nevertheless, there is no conclusive evidence regarding the trends over time in favor of either social mobility or social reproduction in modern societies. It is also unclear how educational expansion influences the magnitude of educational inequalities and its patterns across societies. Overall, much of the body of literature on the research area can broadly be represented as a debate between two main tenets: equalization of opportunities (i.e., social mobility) versus persistence of inequalities (i.e., social reproduction). These are associated with two macro-level theories, namely, the *theory of industrialism* and the *reproduction theories*. While the former theory insists on a reduction of social inequalities, or a tendency towards social mobility, the latter predicts the persistence of inequalities.

4.3.1 The Theory of Industrialism

Blau and Duncan interpreted their findings about the predominant role of educational attainment over ascription in the determination of occupational success, as a result of a modernization process of societies. This interpretation established the empirical foundations for the classic *theory of industrialism* or *modernization* (Treiman, 1970) – and post-industrialism – on the basis of functionalist ideas (Parsons, 1951). In general terms, industrial development is understood as a force that affects stratification systems, in which pre-industrial societies based on ascription are replaced by societies with a new order based on attainment or achievement.

A central claim of this theory is that the mechanisms of occupational allocation are behind the industrialism process. With the market competition as the driving force, employers hire the more efficient workers by means of their educational qualifications as indicators of their productivity. This perspective predicts an increase in the importance of educational attainment over time, particularly with the expansion of national education systems, which constitutes a response to the functional requirements of industrial societies. While educational qualifications are thought to progressively determine the occupational outcomes, the impact of social origin on individuals' destinations is expected to be reduced, by providing possibilities of upward mobility to those from poor backgrounds (e.g., DiPrete & Grusky, 1990; Ganzeboom et al., 1989).

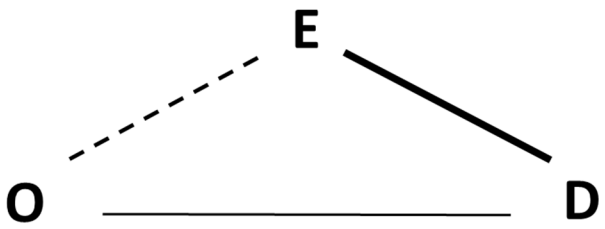
The predictions of the industrialism theory are in line with the idea of *meritocracy*, originally coined by Young (1958). According to it, individuals' life chances are determined by either educational attainment (Bell, 1972) or effort and intelligence (Saunders, 1997), rather than social background. In the last decades, the meritocracy debate has had a revival in sociology and economics, with the publication of the *Bell Curve* (Herrnstein & Murray, 1996), in which major part of the association between social origin and cognitive development is argued to be strongly explained by genetic inheritance.[60] Nevertheless, there is no concluding empirical evidence that demonstrates meritocratic legitimation. For instance, Breen and Goldthorpe (1999) have found for the case of Britain that merit, understood in terms of individual ability and effort, plays only a limited role in the process of intergenerational class mobility and does not weaken the impact of social origin. When merit is understood as educational attainment, the authors also found that its effect increases but is still low. They concluded that there is a significant, strong association between class origins and destinations, even when the individual's education level, ability, and effort are held constant together. This conclusion was further supported by a subsequent study by comparing different cohorts (Breen & Goldthorpe, 2001).

The idea of education-based meritocracies, according to which the individual's socioeconomic position in society is exclusively based on his or her attained education as a reflection of his or her merit, has gained wide influence among scholars, policy analysts, and politicians. This scenario implies three trends over time in the relationships between origin, education and destination in the O-E-D triangle (Goldthorpe, 2003), as illustrated in Figure 5: (a) no or gradually diminishing association between social origin and educational attainment, (b) a gradu-

60 For a reanalysis of this study, see Korenman and Winship (1995).

ally increasing determination of education in individual's occupational outcomes, and (c) a gradually diminishing direct effect over time in the overall association between individuals' social origin and outcomes, once educational level is taken into account.[61]

Figure 5: Predictions of the education-based meritocracy



Source: Adapted from Goldthorpe (2003, p. 234).

Looking at each one of these predictions on the basis of empirical evidence on trends over time and across nations, the following findings emerge. Regarding the O-E association, Shavit and Blossfeld (1993)'s seminal book on *Persistent Inequality* states that despite progressive educational expansion the effect of social origin on educational attainment has not diminished but remained remarkably stable since the early 20th century in 11 out of 13 countries analyzed. In contradiction to the functionalist expectation, the persistence of IEO was a dominant view in the 1990s. The two exceptions were Sweden (Erikson & Jonsson, 1996a; Jonsson, 1993) and the Netherlands (de Graaf & Ganzeboom, 1993), which showed a decline in the impact of father's education and occupation on children's outcomes. These results, however, have been challenged by a number of studies conducted in the last two decades, which have found an apparent pattern, whereby effects of social origin seem to decline, especially in later educational transitions compared to earlier ones (Breen & Jonsson, 2005; Breen, Luijkx, Müller, & Pollak, 2009; Rijken & Ganzeboom, 2000; Shavit, Yaish, & Bar-Haim, 2007).

As for the E-D link over time, recent studies show an increase in the case of the United States, while in many European countries the tendency is towards a

61 Indeed, if the (a) trend holds, "there is no longer any need to control for education because education is independent from social origin" (Bernardi & Ballarino, 2016, p. 15).

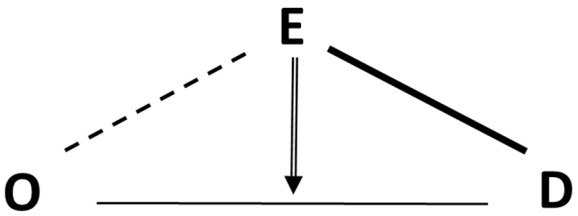
reduction – or at most stability – in the returns to formal higher education (e.g., Breen & Goldthorpe, 2001; Wolbers, de Graaf, & Ultee, 2001), contrary to what the idea of education-based meritocracy would predict. Despite the progressive expansion of higher education systems over the last decades, the existence of high levels of youth unemployment among university degree holders in some European countries has introduced again the argument of an *inflation of educational credentials* into the public debate (Collins, 1979). A similar trend has also been found in Latin American nations (e.g., Torche & Costa-Ribeiro, 2007). Apart from the credentials devaluation, this decline may be associated with the social segregation and lack of relevance of the educational supply (Solís & Blanco, 2014). Also, a set of 'non-meritocratic' mechanisms behind social origin effects on income have been identified by Erikson and Jonsson (1998), which include: social networks, preferential treatment, non-cognitive skills (e.g., personality traits or communication abilities), and career aspirations. It seems that the importance of such mechanisms – derived more from socialization than from education – is likely to increase value for employers in contemporary societies (Goldthorpe, 2003).

Finally, the overall O-E-D relationship involves what statisticians call an *interaction effect*, that is, when the association between two of the components varies with the value taken by the third one. Under the purposes of the present research, I will only examine the interaction effect of education on the origin-destination association[62] (see Figure 6). The interpretation of this effect by industrialism theorists is as follows: the higher the level of education, the weaker the association between class origin and destination.

Whether education – or more precisely higher education – is the great equalizer (Bernardi & Ballarino, 2016; Torche, 2011) is a recurrent topic in public debate and a disputed question in scholar research. According to the industrialism theory, once two persons attain the same educational level, they have the same opportunities of success in the labor market, beyond their differences in ascriptive factors. Thus, the direct effect between origin and destination might diminish as more people get higher education.

62 Goldthorpe (2003) also identifies an interaction effect of social origin on the association of educational attainment and destination, which is interpreted as follows: the more advantaged the social background, the weaker is the link between education and individual's final position. However, as previously noted, the E-D association is not the focus of this book.

Figure 6: Interaction effect of education in the origin-destination association



Source: Adapted from Goldthorpe (2003, p. 238).

Empirical studies on the O-E-D association at the higher education level show contradictory findings. On the one hand, a group of works have found that higher education plays an important role at canceling the influence of social origin. In several European countries as well as in the United States (e.g., Breen & Luijkx, 2004b; de Graaf & Kalmijn, 2001; Hout, 1984; Mastekaasa, 2011) a decline in the direct effect of social origin on labor outcomes has been found due to the individuals' own educational level. The major conclusion of these studies has been that the higher an individual moves in the upper levels of the education system, the less he or she is anchored in the labor market according to his or her social origins. For example, Enders (2002) found that whereas social origin does have a strong impact on access to doctoral studies in Germany, this is not a crucial factor in the occupational destination among doctoral degree holders.

On the other hand, another group of studies attempt to show that despite its expansion, higher education loses its ability to break the link between social origin and destination among those highly educated. In that direction, Torche and Costa-Ribeiro (2007) have shown that in Brazil and Mexico the trends over time are towards an increase in the O-D association among those who attain advanced educational credentials. With data from the United States, Torche (2011) found a U-shaped pattern, whereby intergenerational association is strong among those with low educational attainment, it weakens among bachelor's degree holders, and it appears strong again with advanced postgraduate titles. In the same line, other studies – not focused exclusively on higher education – have found direct effects of class of origin on class of destination in several European countries (e.g., Breen, 2004; Breen & Whelan, 1993; Hansen, 2001), which suggests that the O-D association is not weakening despite educational expansion.

4.3.2 Reproduction Theories and Social Mobility

On the other side of the debate, the promoters of the idea of persistent inequalities argue that social origin continues to have a strong impact on individual's destination across all time, place, and levels of education. At the same time as Blau and Duncan's publication, this idea emerged and found support with the reproduction theories (Bourdieu & Passeron, 1964, 1977), which claim that educational institutions work to reproduce the existing social inequalities in stratified social systems. To describe the reproductive role of educational institutions, Bourdieu (1998) adopts the metaphor used by Scottish physicist Maxwell in the framework of the second law of thermodynamics:

> Maxwell imagined a demon who sorts the moving particles passing before him, some being warmer, therefore faster moving, others cooler, therefore slower moving; the demon sends the fastest particles into one container, whose temperature rises, and the slowest into another container, whose temperature falls.… The education system acts like Maxwell's demon […] it maintains the preexisting order…. the system separates the holders of inherited cultural capital from those who lack it (p. 20).

Reproduction theories predict that the association between origin and educational attainment does not diminish in industrial societies, as students from advantaged cultural backgrounds are better equipped with the necessary linguistic and cultural knowledge and skills to succeed at school. Although the studies compiled in Shavit and Blossfeld's (1993) book do not test directly the reproduction theory, their conclusions appear to be more in line with the idea of persistent inequalities (Ishida et al., 1995), since the O-D association has not been found to diminish with industrial development or educational expansion.[63]

Consistent with the reproduction perspective, strong criticisms to functionalist ideas also arose among critical scholars from a Marxist perspective. In their book *Schooling in Capitalist America*, Bowles and Gintis (1976) describe how families, schools, and the capitalist economy interact to produce inequality. In particular, critical theory affirms that education systems in capitalist societies replicate the configuration of social relations in the labor market and reinforce the class structure, thus limiting social mobility. Beyond skill acquisition, the most important role of education is socialization of students, which is tuned to

63 Nevertheless, Breen and Jonsson (2005, p. 226) highlight that Shavit and Blossfeld's project does not support any of the macro-oriented hypotheses proposed by the authors, "… mainly because the prevailing pattern found was stability in origin effects on educational transitions."

various levels of jobs or social positions in the labor market. A strong argument of these theories is that attainment studies have often underestimated the effects of social origin mainly because students from different socioeconomic backgrounds have fundamentally different schooling experiences, which in turn impact their subsequent life chances (Rangel & Lleras, 2010).

More recently, other scholars have aimed at identifying mechanisms of reproduction of the transmission of advantage. For instance, Jonsson, Grusky, Di Carlo, and Pollak (2011) have centered their attention on three main types of resources that depend fundamentally on the parents' conditions and that have an impact on children's labor outcomes: economic, social, and cultural resources. Accordingly, individuals from privileged social origin tend to secure high-status occupational positions by virtue of the access to: (i) economic resources needed to 'purchase' elite education or capitalize on entrepreneurial opportunities, (ii) social networks providing information and entrance to the highly rewarded occupations, and (iii) cultural and educational resources that provide them with the cognitive and interactional skills to succeed in such occupations.

Finally, introducing the *life course perspective*, which focuses on questions about individuals' trajectories,[64] to the analysis of social mobility, allows us to explore possible changes in the social origin's effects on individuals' outcomes across their life span in different domains (e.g., education, work, family, etc.). From this perspective, prior educational transitions and outcomes may have long-term consequences in the individuals' future occupational trajectories, and so, these consequences are often cumulative, according to the so-called *Matthew effect* or the principle of cumulative (dis)advantages. Originally coined by sociologist Robert Merton in the late 1960s in the framework of scientific careers, the *cumulative advantage* is a widely used concept in social scientific literature (e.g., social mobility, poverty, race, crime, education, and human development) to denote a favorable relative position of an individual or group that becomes an advantage over others and that grows over time (DiPrete & Eirich, 2006).

4.3.3 The MMI and EMI Hypotheses

Even if industrialism and reproduction theories are opposed in their predictions, they share a claim of relative disregard for the specific characteristics of national

64 For an introductory reading on the emergence of the life course paradigm, see: Elder, Johnson, and Crosnoe (2003). A short summary on the new directions of life course sociology is in Mayer (2008).

institutional arrangements (Torche, 2005). More recently, two alternative hypotheses in the empirical sociological research have emerged, namely: the *Maximally Maintained Inequality* hypothesis (hereafter MMI) and the *Effectively Maintained Inequality* hypothesis (hereafter EMI). Both hypotheses support the idea of persistent inequalities despite educational expansion. Initially, these hypotheses have arisen within the sociological research tradition of stratification in the context of secondary education, but they are now applied to the level of higher education due to the progressive expansion of the national systems of education.

The MMI hypothesis (Raftery & Hout, 1993) claims that if a given level of education becomes universal for upper-class individuals, then the effect of social background on that transition declines over time, as lower-class individuals gradually obtain more schooling. The hypothesis suggests that those coming from privileged social origin are in a better position for accessing the new educational opportunities provided by the system expansion. It predicts that educational expansion would diminish *quantitative* or *vertical inequalities* (i.e., differences in years of schooling or educational levels completed) only in those levels of education where the enrollment rate of the most advantaged socioeconomic group reaches the "saturation point" (Boliver, 2010, p. 1).

A recent concern on the origin-education association has been extended from the quantitative dimension to the qualitative dimension: "qualitative differentiation replaces inequalities in the quantity of education attained" (Shavit, Arum et al., 2007, p. 4). In this line, the EMI hypothesis (Lucas, 2001) predicts that, despite universal enrollment rates and quantitative inequalities' reduction, *qualitative* or *horizontal inequalities* (i.e., the type of schooling attained) remain. In other words, even if education access is open to all, those coming from privileged households will seek access to higher quality, more prestigious programs and institutions at all schooling levels:

> It may be that as long as a particular level of schooling is not universal.… the socio-economically advantaged use their advantages to secure that level of schooling. Once that level of schooling becomes nearly universal, however, the socio-economically advantaged seek out whatever qualitative differences there are at that level and use their advantages to secure quantitatively similar but qualitatively better education (Lucas, 2001, p. 1652).

While the stratification research in higher education has been largely concerned with attendance and returns, the question of how institutional arrangements of higher education systems shape social inequalities (Buchmann & Park, 2009; Kerckhoff, 1995; Roksa, 2008) has become a relevant matter of research:

> College choices are not about attending college anymore. The simple question of whether to attend is not where the action is. The action is not in whether a student attends, but which college he/she attends (in-state or out-of state, two-year or four-year, more or less selective) and how he attends (continuously or sporadically, full-time or part-time, immediately after high school graduation or delayed) (Hoxby, 2004, p. 1).

Contrary to the idea of *inclusion* through expansion (Dougherty 1994, cited by Shavit, Arum et al., 2007), a group of scholars have suggested that higher education expansion combined with hierarchical differentiation of institutions is a process of *diversion* (Becker & Hecken, 2008; Hillmert & Jacob, 2003). According to this view, individuals from underprivileged social background are 'diverted' from elite opportunities and are channeled to lower-status educational paths and low subsequent occupational positions, thus reserving higher-status opportunities for those from advantaged origins.[65]

Although some studies have found support for either MMI or EMI (Ayalon & Shavit, 2004), both hypotheses are not incompatible at all. Most importantly, how horizontal and vertical stratification are related constitutes a challenge for the current state of knowledge on IEO (Gerber & Cheung, 2008). Even in a scenario characterized by a reduction of the impact of ascriptive factors in access to higher education (i.e., decrease of vertical inequalities), the relative importance of horizontal dimensions of higher education in generating and reproducing inequalities is a significant research issue. This is particularly relevant in highly-differentiated education systems and where institutional differentiation is more important for graduates' occupational outcomes (Triventi, 2013).

4.4 Equalization of Opportunities or Persistent Inequalities?

In the midst of divergent empirical results and diverse theoretical approaches regarding the mechanisms and trends in IEO, two major contrasting scenarios can be identified. In the positive scenario, education is considered as the great equalizer of opportunities. In the competing and less optimistic picture, inequalities are supposed to persist in spite of inclusion, either in the form of vertical or horizontal stratified outcomes.

65 At a structural level, a parallel hypothesis is that expansion also promotes greater stratification among higher education institutions when top-ranked students self-select into elite, highly-resourced universities (Davies & Zarifa, 2012).

These discrepancies may partly be due to methodological issues, such as the selected independent variables (i.e., how social origin is measured) and the outcome variables under analysis (e.g., performance test, decisions on institutional type or track, etc.) (Breen & Luijkx, 2004a).[66] Also, it has been argued that the diversity of measures used for the analysis of social mobility might lead to different results. In this regard, Torche (2011) states that sociological studies on intergenerational social mobility, which typically include parental occupational position, should also consider other indicators of socioeconomic standing of families, such as social class, occupational status, individual earnings, and total family income.

Besides methodological concerns, a group of scholars have proposed an alternative interpretation to reconcile both perspectives by asserting that education plays a dual role (Hout & DiPrete, 2006). As a 'double-edged sword', education constitutes an important avenue for social mobility, on the one hand, but it also contributes to the intergenerational transmission of inequality since it is distributed unequally between strata, on the other. Ishida, Muller, and Ridge (1995, p. 179) conclude that "class reproduction and mobility involve different social processes, which are in turn differentially affected by educational attainment". Similarly, Shavit, Yaish, and Bar-Haim (2007, p. 37) argue: "which of these factors outweighs the other depends on the extent to which educational attainment is affected by social origins". To this respect, Ramirez's (2006) critical comments highlight that the naivety of the industrialism theory does not justify the naivety of reproduction theories: "what is needed is a more nuanced understanding of why and how education undercuts some forms of inequality while giving rise to others" (p. 437).

Whether education is either the great equalizer or a device for the reproduction of inequalities is still much debated. Thus, the need for an investigation around the trends in the O-E-D association can hardly be disputed. If a direct effect of social origin on destination no longer exists, as the entire effect passes through educational attainment, could it then be stated that there is equality of opportunities? Nevertheless, according to Mayer (2017), it should also be acknowledged that, as long as educational outcomes still depend on social background, there will be inequality of opportunities, and education will not be an

66 Similarly, there are divergent or disconnected findings between macro-level research on educational expansion and social mobility studies. On this matter, some authors hold that this apparently discrepancy lies more in the methodological design and interpretation than in the actual empirical results (Ballarino & Schadee, 2010; Lörz & Schindler, 2011).

equalizer. Therefore, examining the O-E association is at the core of the analysis about inequality of educational opportunities. The challenge for educational policy is then how to design an education system in which parental resources are not a determinant for their children's outcomes in the form of access, attainment, achievement or aspirations, as summarized by Hallinan (1988):

> Assuming inequality of inputs to the educational system, the relevant question for sociologists of education, then, becomes how can education change or modify these inputs to produce a more equal distribution of outputs such as academic achievement, educational aspirations and attainment, and in the long run, socioeconomic status and income? (p. 251).

Part III (In)Equality of Educational Opportunities in Colombia

5 Setting the Scene: Education in Colombia

This chapter summarizes the contextual framework of the present study. It outlines some characteristics of the country's education system within the national context. This description aims at giving the reader an idea of three precise events in the educational and occupational trajectories of individuals, which are empirically analyzed in further chapters of this book: (i) access to a certain type of school and academic achievement at the end of upper secondary education; (ii) access to a certain type of higher education institution and academic performance during a first degree program; and (iii) access to the labor market and their occupational outcomes after graduation. Special attention is thus given to both upper secondary and higher education levels. The exposition of figures on the basis of aggregated data is intended to offer an overall picture of the particular characteristics of educational provision as well as the institutional arrangements within which educational inequalities are shaped.

The chapter is divided into four sections, as follows. The first one begins by introducing the country context, describes the extent to which it is a society with particularly unequal life chances, and gives an outline of the structure of the national education system. The second section summarizes some features of primary and secondary education, and presents a group of key indicators on enrollment, student performance, and inequality of outcomes. The third section outlines the main characteristics of the structure of higher education. It also reviews the development of the higher education system in the country, by considering its processes of expansion, institutional differentiation, and privatization. The discussion is complemented by the selection and analysis of some figures on access, achievement, and educational outcomes with a particular emphasis on inequalities. Aggregated data presented here are mostly taken from reports of governmental organizations and international agencies, as well as from official statistics of the national information systems administered by the Ministry of Education. At the end of each section the most important conclusions drawn from the contextual framework are summarized.

5.1 Colombian Education System

Colombia is the fifth largest country in Latin America and the third most populated in the region with an estimated number of 48.2 million inhabitants (DANE,

2020). Nowadays, the country is in the midst of a demographic transition resulting from steady declines in fertility, mortality, and population growth rates. From being a predominantly young country, its current population is concentrated in the prime-working age range (42% of people are aged 25 to 54). Diversity is also a characteristic of Colombian population due to racial and ethnic differences. Afro-descendants and indigenous people comprise the largest minority groups (11% and 3% of the population respectively). One third of the country's population lives in rural areas (UNDP, 2011),[67] where there is an extremely high land inequality.[68] As with population, levels of development are concentrated in a few urban municipalities (Bogotá, Medellín, Cali, and Barranquilla) and in some *departamentos.*[69]

The country has the fourth largest GDP[70] in the region with USD 323.6 billion in 2019 after Brazil, Mexico, and Argentina. Over the last two decades, macroeconomic indicators have improved, thus moving Colombia from the category of a low-income country to that of an upper-middle income country (Cruz, Andrián, & Loterzpil, 2015). From 1990 to 2015, per capita GDP (PPP)[71] grew 183%, which is a very impressive growth rate in comparative perspective.[72] In turn, the country has been able to diminish inflation, attract private investment, and increase savings. In addition, implemented sound policies have boosted substantial social progress: a significant reduction of poverty (from 50% to 27% in the overall population between 2002 and 2018) and a reduction of extreme poverty (from 18% to 8%) in conjunction with the extension of public services across the national territory (CIA, 2020; World Bank, 2020).

67 According to a rural index constructed by the United Nations Development Program (UNDP), the magnitude of this population (32%) is much higher than official calculations (25%) of the National Administrative Department of Statistics (DANE).

68 National land Gini coefficient was about 0.85 in 2011.

69 Colombia is composed of 32 departments alongside the Capital District of Bogotá, which are administrative and political subdivisions similar to provinces. Although Colombia's democratic republic is regulated by the central government, the country's departments have administrative and financial autonomy.

70 Gross domestic product (GDP) on an exchange rate basis.

71 Per capita gross domestic product at purchasing power parity (PPP) basis is the sum value of all goods and services produced in the country in a given year, valued at prices prevailing in the United States, divided by population in that year.

72 During the same time period, the index grew by 148% in Germany, 133% in the United States, and 126% in France. Other economies in Latin America also grew rapidly between 1999 and 2015: the GDP in Chile increased five-fold, while in Peru, Uruguay, and Costa Rica it grew three-fold, and in Mexico it more than doubled, similarly to Colombia.

Nevertheless, economic growth in Colombia coexists with persisting high levels of social inequality, two aspects that are often discussed either separately or without a clear consensus about their relationship within the political discourse in the national context. Thus, the tendency of the last governments has been to consider growth-oriented macroeconomic policies as the automatic formula for alleviating unequal income distribution and poverty (Franco, 2009). Similarly, there is also no agreement among scholars on the relationship between inequality and growth: whereas some authors argue that they are opposite processes, others claim that they are positively correlated. Still others have gone further and suggested more complex models that combine both positive and negative relationships over long periods of time.[73] At any rate, at least in the case of Colombia, it seems that the analysis should not separate inequality and growth, as they are 'two sides of the same coin' (Berg & Osrty, 2011).

With a Gini index[74] that amounted to 50.4 in 2018, Colombia is the third most unequal country in the region after Brazil and Honduras, and it ranks 15th in the global list (CIA, 2020), which implies very high ratios of income accumulation among the wealthiest segments of the population relative to the poorest ones. Even though this index has improved marginally from 58.7 in 2000 (World Bank, 2020), the improvement is small enough to maintain the country's position among the least equal nations in the region. So, although social indicators have improved substantially, persistent high levels of inequality have made poverty alleviation harder. Also, one should bear in mind that the magnitude of social inequality in the country is closely associated with the prevalence of high crime rates, illegal drug production, and a long history of internal armed conflict and political violence. Indeed, Colombia cannot be understood without taking into account the origins and consequences of this phenomenon. For nearly six decades, internal conflict has resulted in violations of human rights, intense internal displacement, social conflict, and negative impacts on the economy, thus shifting attention away from social policy, which in turn has reinforced poverty and inequalities (World Bank, 2008a).

The persistence of social inequalities over time in the country, as in other Latin America nations, is to a great extent due to the establishment and further

73 For a summary of the main positions and corresponding empirical findings in the Colombian case, see: Galvis and Meisel (2010).

74 The Gini index measures the degree of inequality in a distribution, e.g., family income in a country. It ranges from 0 (complete equality of income across all families) to 100 (complete inequality: the totality of income associated with a single family).

development of colonial institutions. Their roots can be traced back to the colonial period during the sixteenth, seventeenth and eighteenth centuries, when Colombian society was based on an economic structure in which wealth, education, and political power were distributed in highly unequal patterns. In that regard, diverse authors (e.g., Acemoglu, Johnson, & Robinson, 2001; De Ferranti et al., 2003; Sokoloff & Engerman, 2000) agree on the argument that colonial institutions have been preserved not because of the colonizing power's identity but because of their initial privileged conditions in the colonies.

Mostly of European descent, the government elites adapted the institutions and policies to their advantage. As a result, the extension of social services such as public universal education was very limited. Indeed, one of the arguments in favor of the pro-independence movement from Spain held by educated Creoles[75] could be exemplified in the following excerpt from the Independence Declaration of the province of Tunja, Colombia in 1814: "No other example of this political grievance is more notable in our province than the fact that in three centuries not even one elementary school had been established for the instruction of the youth" (cited by Caruso, 2010b, p. 416).

It was only until the post-independence period in the 19th century that the national administration expressed support for developing a system of state educational institutions and a few efforts were made in this direction. Nevertheless, in the course of the 20th century, the new (Creole) elite kept effective control and structural inequalities remained essentially the same. The estimates of Londoño (1995, cited by Bonilla, 2009) illustrates convincingly this situation: inequality varied little during the last century, to the extent that the magnitude of inequality in Colombia by 1988 was at about the same level as it was in 1938. In words of De Ferranti et al. (2003):

> Although these colonies ultimately gained independence and the development of technology and the world economy brought about important changes, extreme inequality persisted into the 19th and 20th centuries because the evolution of political and economic institutions tended to reproduce and reinforce highly unequal distributions of wealth, human capital, and political influence (p. 171).

As briefly outlined here, Colombian society represents an appealing case study on the topic of social inequality. It is a country among the top performers in the region with regards to economic growth and poverty reduction over the past de-

75 In Hispanic America, *Criollos* or Creoles were locally-born people of Spanish ancestry. In the social stratification system, this group was located below the Iberian-born group.

cade but, nonetheless, it continues to have extremely high levels of economic inequality and whose differences in social indicators between rural and urban areas persist at equally high levels. Over the last few years, in the framework of the post-conflict agenda, the government's National Development Plans set out social equity as a priority under the premise according to which sustainable peace is key for growth and fiscal revenue[76]: "Realizing these gains will depend in part on Colombia's capacity to expand the access and quality of education at all levels" (World Bank, 2017a, p. 9), and especially at the level of higher education for those socioeconomically disadvantaged. Therefore, the actual role of education in a highly unequal setting as the one Colombia exhibits deserves special attention.

Despite the socioeconomic challenges and regional disparities that the country faces, remarkable progress in education has been made since the beginning of the present century. With the urgent need of strengthening the national education system, a series of measures toward access, quality, and equity haven been undertaken. It is worthwhile noting the government's major investments in infrastructure and education resources: between 2000 and 2018, public expenditure on pre-primary, primary and secondary education in terms of percentages of the GDP went from 2.8% to 3.4%. Also, in 2015 the budget for education was for the first time higher than that allocated to defense (Cruz et al., 2015). Overall, Colombia devote a large share of national wealth to education that has surpassed spending levels in other upper middle income nations. These figures are quite astounding since typically spending on education tends to increase with the country's income. Nevertheless, the private share (at over 3% of GDP) is much higher than the OECD average of less than 1%, and it is mostly concentrated at the level of higher education. Besides, annual expenditure per student is still low in comparative perspective: in 2018, the country invested a total of USD 3,538 per student, which makes up less than one-third of that of OECD countries (USD 11,231 on average).

With the purpose of examining some figures and trends in educational indicators of enrollment, performance, and completion in the sections that follow,

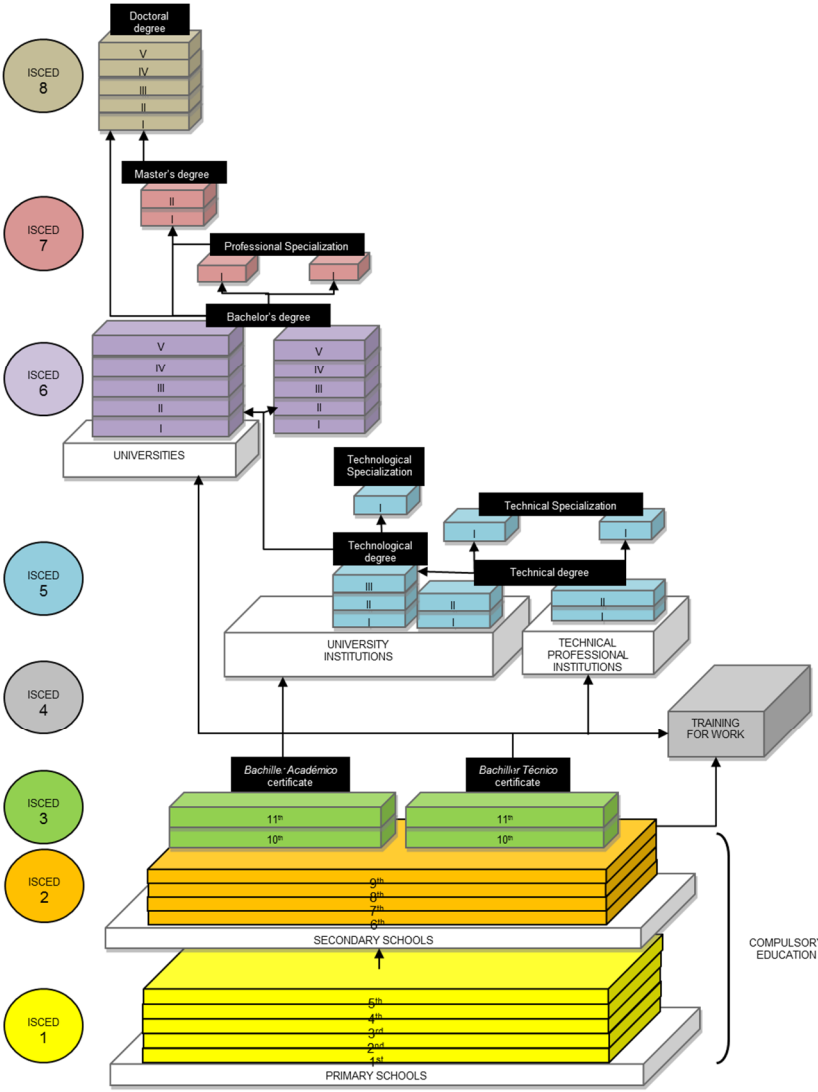
76 The National Development Plan (NDP) serves as the state's action orienting tool. It is of special mention the NDP 2014–2018, which was supported in three pillars of economic and social development: peace, equity, and education. Since the 1991 Political Constitution, it was the first time that a NDP made education as a reference point (MEN, 2016a). It also established the ambitious goal to become the most educated country in Latin America by 2025. The current NDP 2018–2022 emphasizes the issue of equity although it does not directly address education as a central topic.

the main structure of the national education system shall be described first. Education in Colombia is a civic right, according to the principles of the 1991 Political Constitution. The structure of the national education system is defined by the legal and normative framework on education, which is mainly based on two laws: the General Education Act 115 of 1994 (CRC, 1994) and the Higher Education Act 30 of 1992 (CRC, 1992). The National Ministry of Education (Ministerio de Educación Nacional: MEN) is the main body responsible for education at all levels. Among its functions, the MEN sets national policies, defines standards, guarantees access and equity, and inspects and evaluates quality. The former law paved the way towards the decentralization of the education system, by giving to the Certified Territorial Entities the functions of implementing education policy, and monitoring provision and quality of both public and private sectors. A distinctive feature of this decentralized system is the schools' autonomy over the curriculum to meet the needs of the country's diverse population groups.

Law115/1994 establishes the general norms that regulate the first three levels of formal education,[77] namely: (i) preschool education or ISCED level 0; (ii) 'basic' education (*educación básica)* which is composed of five years of primary education or ISCED level 1 (from Grades 1 to 5) and four years of lower secondary education or ISCED level 2 (from Grades 6 to 9); and (iii) 'middle' education (*educación media*) which corresponds to upper secondary education or ISCED level 3, which lasts two years (Grades 10 and 11). Figure 7 contains an illustrative scheme of the system's structure.

77 The formal education system of a country is defined as the "education that is institutionalized, intentional and planned through public organizations and recognized private bodies" (UIS, 2012, p. 11).

Figure 7: Structure of the Colombian Education System



Source: Own elaboration.

Notes: Black boxes indicate educational certificates. Specialties in medicine (ISCED level 7) are not shown in the figure, as they have a longer theoretical duration (i.e., 3–6 years).

Compulsory education comprises from the last year of early pre-primary education (*transición*) until Grade 9, that is, students in the range between 5 and 15 years old (theoretical entrance and exit age[78]). Students completing Grade 9 who do not continue with upper secondary education have the option to follow post-secondary non tertiary education programs (ISCED level 4), which are called 'training for work' (*formación para el trabajo*). These courses have a duration of minimum 600 hours, and are aimed at preparing students for practicing a productive activity. Upper secondary education is not compulsory and lasts two years (Grades 10–11 for 15 and 16 year-olds). Upper secondary education programs can be *academic* or *vocational* oriented.[79] Upon successful completion of upper secondary education in both tracks, students are able to apply for entering a higher education programs at either ISCED level 5 or 6. Students who do not pursue higher education studies, can either take courses at ISCED level 4 or enter directly into the labor market.

Higher education in Colombia includes ISCED levels 5 to 8[80] and is structured around Law 30/1992, which regulates and establishes its principles, objectives, as well as the kind of education programs and types of higher education

78 Theoretical entrance age is the age at which students enter an education program assuming that they have started at the official entrance age for the lowest level of education, and studied full-time throughout without repeating or skipping a grade (UIS, 2020b).

79 Equivalent to the UNESCO terms *general* and *vocational*. This document will rather use the national terminology (i.e., *academic* and *vocational*). However, it is to be noted that, in order to avoid confusion with the technical programs in higher education, the term *technical* has been changed by *vocational.*

80 Distinctions between the terms *tertiary education* and *higher education* are blurring throughout the world, and certainly in Colombia. Even though 'higher education' became a popular term in the second half of the 20th century – describing the "intellectually most demanding stage" of education (Teichler, 2001, p. 6700) – some organizations in the 1990s – the OECD being a prominent advocate – argued that 'tertiary education' was a preferable term for three main reasons. First, it denotes its universal character as opposed to a highly selective participation; second, it follows a sequential logic after primary and secondary education; and third, it also includes non-university advanced programs, which are typically shorter and more closely linked to the labor market (OECD, 1998). In Colombia, 'higher education' is used to make reference to ISCED levels 5 to 8. Thus, higher education will be preferably used throughout this document. Nevertheless, as established in the 2014–2018 National Development Plan, Colombia currently seeks to establish the National System of Tertiary Education (*Sistema Nacional de Educación Terciaria*: SNET) to restructure all programs after upper secondary education into two pillars: a university pillar and a tertiary vocational education and training (VET) pillar.

institutions (hereinafter HEIs). The freedom of teaching and research for HEIs is guaranteed by the Colombia's Constitutional Reform of 1991. The Colombian higher education system offers six different kinds of programs at the ISCED 5–8 levels, distributed into four types of HEIs. The short-cycle non-university higher education (ISCED 5) is known as technical and technological education and includes two kinds of programs: technical professional and technological. ISCED level 6 corresponds to professional undergraduate programs leading to a bachelor's degree. Finally, ISCED levels 7 and 8 correspond to 'postgraduate' education. The former includes professional specialization programs, master's degrees, and medical specialties, and the latter doctoral programs. Further details on higher education programs and institutions are described in next sections.

5.2 Primary and Secondary Education: Features and Trends

Divided into three parts, this section briefly addresses the current situation of primary and secondary education by summarizing main features and trends in key education indicators. This first part considers two main issues of the provision at primary and secondary education levels: organization of schools and student assessment. Although for a complete description other issues are also relevant (e.g., infrastructure; funding; curriculum and educational processes; governance; teacher's qualifications, training and salaries; among others), a discussion on them falls outside the scope of this book. The second part presents the main trends in access, achievement, and equity. It begins with an overview of national figures on net and gross enrollment rates in these educational levels. It also shows some patterns in the distribution of access and completion by sector and location. Then it deals with performance of Colombian students in comparison with that of students from other countries in Latin America through the analysis of scores in international tests. Student achievement in national tests is also examined as well as how it is distributed within the country. Finally, the last part summarizes the main conclusions of this section.

5.2.1 Provision of Primary and Secondary Education

Organization of Schools

Although there is no official classification of schools in Colombia, these can be categorized according to two formal dimensions: educational level and track. The

distribution of schools by sector and location is also key in the current organization of provision in primary and secondary education.

For many years, most schools have been offering only either primary or secondary education, and just a few offered all grades from pre-primary until upper secondary education. For that reason, the MEN started to promote since 2003 the clustering of public schools to ensure educational supply in all grades within the same school network (OECD, 2016a). Nowadays, public school branches *(sedes)* are organized in school clusters *(instituciones educativas).* In 2014, the total number of school branches was 50,991 (see Table 5). In the case of public schools, there were about 44,400 school branches and more than 13,000 school clusters (García, Maldonado, Acosta et al., 2016).

Table 5: Number of school branches by sector, location, and level of education (2014)

	Public	**Private**
Level of education		
Primary	43,739	6,399
Lower secondary	10,814	3,418
Upper secondary	8,252	2,082
Location		
Urban	9,718	6,259
Rural	34,698	319
Total	**44,416**	**6,575**

Source: Own elaboration based on OECD (2016a). More recent and reliable data of public schools are found in the report of García, Maldonado, Acosta et al. (2016). Based on high-quality statistical information, it constitutes the first systematic work on current public provision by academic/vocational track.

Note: The number of school branches by level of education cannot be aggregated as they might be counted in more than one category. Public provision also includes mixed-fund schools.

As previously mentioned, the distinction between *academic* and *vocational* in the orientation of education programs starts in Colombia at the upper secondary level. Academic education aims at developing students' general knowledge, skills and competencies, as well as literacy and numeracy skills, and it also aims at preparing learners for more advanced education programs. In contrast, vocational education programs are designed for students to acquire knowledge, skills and competencies which are specific to a particular occupation or trade (UIS, 2012). Contrary to other national education systems in high-income countries, the divide of paths in the Colombian upper secondary education are of free choice for the students and their families, which means that no previous evaluation of

the student's abilities is required to determine which track they are able to attend.[81] Schools offering upper secondary education can be specialized in one of the tracks: by 2015, 59% of the school branches were academic oriented and 28% vocational oriented (García, Maldonado, Acosta et al., 2016). In some cases (13%), both options are offered in the same school branch and students take similar subjects, "making the distinction more one of emphasis than separate tracks" (OECD, 2016a, p. 201). Currently, three-quarters of students are enrolled in academic programs.

Colombian schools are also distributed according to sector and location. Public provision is provided by publicly managed schools, while private provision is composed of those schools that "are not operated by a public authority but controlled and managed, whether for profit or not, by a private body" (UIS, 2020b). Private bodies in Colombian education include religious communities, foundations, non-governmental organizations, associations, among other special interest groups. More recently, public-private partnerships' educational policies have been implemented to assist children from low socioeconomic strata.[82] Furthermore, one should keep in mind that the distribution of schools by sector is intertwined with location, as private schools are mostly located in urban areas, as observed in Table 5.

Instruction Time

The length of the school year and the minimum number of lessons per week are regulated by law (MEN, 2002), as follows: 25 hours per week (equivalent to 1,000 lesson hours a year) for compulsory education, and 30 hours per week (equivalent to 1,200 lesson hours a year) for upper secondary education. Each school organizes both its school day and school calendar according to its preferences but also to meet the particular regional demands.

Most public schools operate an estimated 5–6 hour school day – called half-day schooling (*media jornada*). This modality comes from a 'double-shift

81 For a comparison of Colombian upper secondary education with that in other countries, see Celis and Cuenca (2016). Unlike the international trend, upper secondary level in the country exhibits three differences of particular interest: the lack of a previous evaluation, the absence of a national curriculum framework, and a theoretical duration of 2 instead of 3 years.

82 Examples of these partnerships are: *Colegios en concesión*, a type of the so-called 'Charter Schools' model, which is intended to provide high-quality, privately managed, and publicly funded education; and *Matrículas contratadas* through which private schools offer a limited number of publicly funded places.

schooling' policy implemented in the late 1960s with the aim of increasing student enrollment (García, Fernández, & Weiss, 2012). Thus, a great number of students could attend the same educational institution split in two groups, one attending in the morning and another in the afternoon. In recent years, however, the MEN is making efforts to implement full-day schooling (*jornada completa*) with a minimum of 7 hours in all schools.

School calendar refers to the academic year, that is, the annual period during which students attend courses or take examinations at school (UIS, 2020b). There are three different school calendars in Colombia: A, B, and F. The A calendar starts at the beginning of the year and finishes at the end of it, typically between February and November, with a vacation break during mid-June and mid-July. The B calendar usually starts in August and ends in May, having the vacations period between December and January. Finally, the F calendar is a flexible school year.

Student Assessment

Over the last two decades, Colombia has developed reliable instruments for assessing the quality at different levels of education. These instruments are fundamentally based on the assessment of student achievement throughout a set of national standardized tests, designed and administered by the Colombian Institute for the Assessment of Education (Instituto Colombiano para la Evaluación de la Educación: ICFES). At present, there are seven tests: SABER 3, SABER 5, SABER 7, SABER 9, and SABER 11 for Grades 3, 5, 7, 9, and 11 respectively; SABER PRO for ISCED 6 programs; and more recently SABER T&T for ISCED 5 programs. The availability of data gathered by these tests has produced relevant and valid information, mostly on the competencies acquired by students in primary, secondary and higher education.

While primary and secondary students must take these tests in several Grades, scores obtained are not part of the individual final marks. In the final year of upper secondary education (Grade 11), students must present a standardized examination called SABER 11,[83] which is a requisite for graduation in both general and vocational tracks. This national exit exam is the main means of certifying the competencies acquired at the end of the students' school life. Upon successful completion of upper secondary education, students are awarded the certificate of *Bachiller académico* for the general track or *Bachiller técnico* for the vocational

83 For a detailed description of SABER 11 exam, see Annex A.

track. Although this certificate is theoretically enough to allow students to enter higher education and the labor market, in practice SABER 11 constitutes "the passport to a future career in education and formal employment" (OECD, 2016a, p. 203). Individual's scores determine whether a student is able to gain access to a particular higher education institution. Typically, each higher education institution determines the minimum score required to apply for a place in a specific program of studies, although most institutions have additional admission requirements (e.g., interviews and their own entry exams).[84] In sum, SABER 11 results are not only important for schools[85] and students themselves, but also for higher education institutions, employers, secretaries of education, and policymakers. They are also key for students to apply for education loans.

In 2015, under the purpose of developing more comprehensive measures of quality at school level, the MEN constructed a synthetic index of educational quality (ISCE for its abbreviation in Spanish). It includes measurements in four components at primary and secondary education levels, namely: (i) improvement compared to the previous year; (ii) efficiency in terms of completion rates, (iii) school average performance in the different SABER tests; and (iv) school climate (MEN, 2015). In spite of the efforts of using more accurate measures of school quality, this index has been received with reluctance among members of the education community.[86]

84 In other countries (e.g., Chile and those within the European Union), there is a national body in charge of coordinating the admission process of students and the allocation of places into higher education institutions. In the absence of such an institution, Colombian students have to conduct their own individual process of admission based on the specific requirements asked by each institution.

85 A common critique, however, points out that in the absence of a national curriculum, the high-stakes national examinations in general, and SABER 11 in particular, are very influential on school curricula, by focusing on the competencies assessed and narrowing the courses offered by schools (OECD, 2016a).

86 Some of the most frequent criticisms are: (i) it fails in not informing about the socioeconomic composition of students and how it has an effect on academic achievement; (ii) it does not contribute in the understanding of between- and within-school variation; and (iii) more recently some scholars (Molano, Rodríguez, & Bayona, 2017) have pointed out the detrimental consequences of implementing incentive strategies based on indices of this kind.

5.2.2 Some Indicators of Resources, Process, and Results

Increased Enrollment

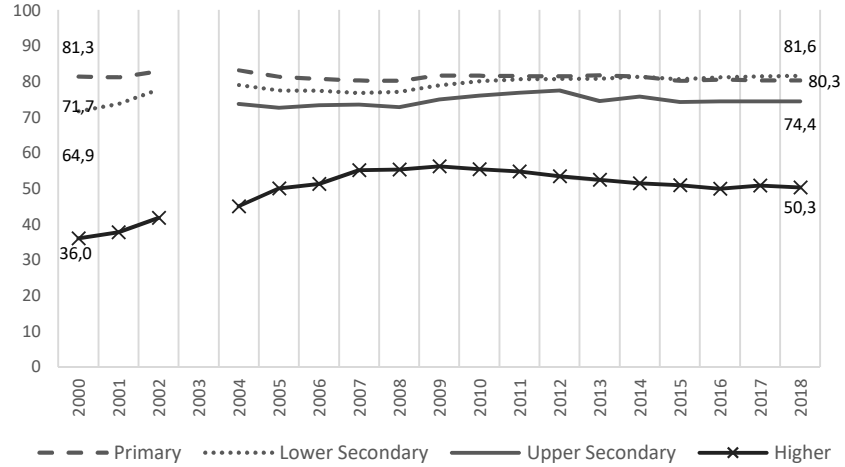
The national education system has grown exponentially since the 1960s. In just twenty years (1966–1986), primary school enrollment more than doubled and secondary school enrollment grew six-fold. Over this century, whereas public primary education has constantly maintained its share of approximately 80% of the age cohort and thus contributed to the trend towards universal access,[87] educational coverage in public secondary education has steadily enlarged. In 2018, approximately 7.7 million students were enrolled in basic education, and about 1.3 million youth in upper secondary education (UIS, 2020a).

In contrast to higher education, enrollment at primary and secondary levels is highly concentrated on the public sector. As observed in Graph 1, the high percentage of public enrollment in primary and lower secondary education (about 80% in 2018) indicates a strong involvement of the state in providing compulsory education. From the graph it is also noticed that public enrollment has gradually increased from the beginning of this century, especially in secondary education. This rise could be partly explained by the recent implementation of a free education policy. In the case of public schools, families had to pay fees before 2008. In fact, Colombia was the only country in Latin America at that time where primary education was not free (World Bank, 2008a). Even though fees were calculated at a low cost according to the household's socioeconomic stratum,[88] this was found as a major constraint for families to send their children to school. In 2008, provision of education free of charge started in the last year of pre-primary, and in all grades of primary and secondary education for children from low-income families. Between 2011 and 2012, it was extended for all children in the official school-age population (Barrera et al., 2012). Still, indirect costs such as transport and learning materials remain. As for the private schools, systematized information about fees and other aspects of private funding is limited.

87 Defined as gross enrollment rate above 90%, in the case of primary and secondary education.

88 There is a socioeconomic stratification system in Colombia to classify housing units into 6 strata according to their characteristics and those of their neighborhoods. Ranging from 1 (lowest) to 6 (highest), the strata determine the cost of the supply of public utility services, being the lowest strata subsidized. This system is also used to set differentiable rates such as taxation, tuition fees in public universities, health subsidies, etc.

Graph 1: Percentage of public enrollment by level of education (2000–2018)



Source: Own elaboration using UIS (2020a).
Notes: No data available for 2001 (upper secondary education) and 2003 (all levels). Figures of secondary education from UNESCO are slightly lower compared to official data from DANE (2016), which could be due to the inclusion of mixed-fund education programs in the latter.

In spite of the key role of the public sector in growth enrollment, about one fifth of Colombian students attend privately managed schools. Colombia has slightly more students enrolled in private institutions than the OECD average (OECD, 2016a). Regarding the composition of students by school sector, pupils at private schools tend to be from socioeconomically advantaged backgrounds, which is a pattern observed in most countries[89] and that is especially pronounced in the case of Colombia (OECD, 2012). Indeed, 47% of the country's most-advantaged quarter of students attend privately managed schools, while only 2.3% of the country's least-advantaged quarter of students attend such schools.

Despite substantial progress in enrollment, especially in the public provision, a couple of crucial problems need to be mentioned. First of all, it should be noted that growth in enrollment may also reflect population changes. Colombia, as

89 Exceptions are: Estonia, Finland, Indonesia, Israel, Luxembourg, the Netherlands, the Slovak Republic, South Korea, Chinese Taipei, Hong Kong-China, and Shanghai-China.

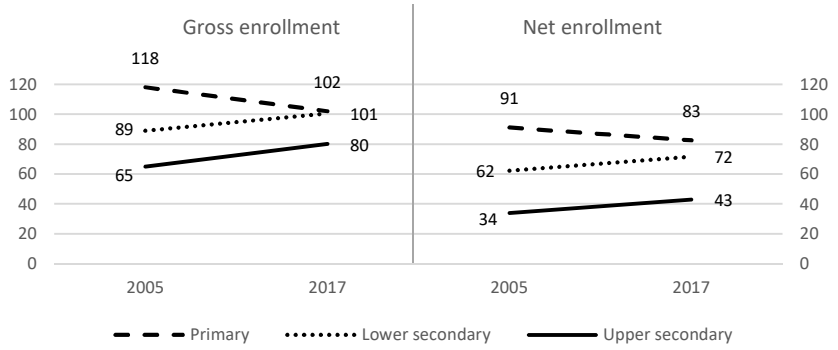
nearly all countries in Latin America, is currently in a period of *demographic bonus.*[90] Due to lower levels of fecundity and birth, the number of school-aged children has reduced. On this matter, some authors (Delgado, 2014) argue that this transition has had an impact on decreasing the demand for primary and secondary education, which in turn represents an opportunity to invest and concentrate efforts towards educational quality and equity. Although there is no doubt that demographic changes have had an indirect improvement in educational coverage indicators at the national level, participation is still unequally distributed within the country.

Second, there are important differences between gross and net enrollment rates that require analysis. As observed in Graph 2, whereas gross enrollment ratio[91] by 2017 amounted percentages above 100% for compulsory education, and 80% for Grades 10 and 11, the net enrollment rate in the same year shows much lower figures: 83%, 72%, and 43% for primary, lower- and upper-secondary levels of education respectively. From the graph we can also see the changes in the differences between gross and net enrollment rates over the years. Interestingly, these differences have increased for the case of secondary education, particularly at upper secondary: from 31 percent points in 2005 (65% gross and 34% net), this difference raised to 37 percent points in 2015 (80% gross and 43% net). Overall, this indicates that the expansion over the last years has been mainly addressing the educational lag among those over-aged groups (Barrera et al., 2012), composed of late entrants and grade repeaters.

90 Also known as *demographic dividend* or *demographic window of opportunity*, it is a period in which the number of people in potentially productive ages is greater than the number of people in potentially unproductive inactive ages (i.e., children, adolescents, and the elderly). Nevertheless, the latest demographic projections estimate that this period is rapidly closing in Latin America (Cotlear, 2011), and that in the case of Colombia, this will change in just 20 years (Urdinola, 2018).

91 Gross enrollment ratio refers to the "number of students enrolled in a given level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education." By contrast, net enrollment rate is the "total number of students in the theoretical age group for a given level of education enrolled in that level, expressed as a percentage of the total population in that age group" UIS (2020b).

Graph 2: Gross and net enrollment rates in primary and secondary education (2005, 2017)



Source: Own elaboration using SIMAT (2020).
Note: Numbers denote percentages.

Unequal Distribution of Access and Completion

When looking at the enrollment rates within the country across regions, departments, and rural/urban areas, enormous gaps are found. Moreover, individual factors such as socioeconomic levels and gender widen and deepen those gaps. Predominantly, people living in remote regions, rural areas, and/or from low-income families, present significantly lower levels of educational participation.

Differences of educational coverage by location are closely correlated to ethnic and racial differences as well as to socioeconomic background. The more distant regions and departments concentrate mostly low income families from ethnic origin and racial minorities, who still remain at a great educational disadvantage in comparison to whites or *mestizos*: 30% of the indigenous population do not have any education at all, while this percentage in the case of Afro-descendants is 15% (Cruz et al., 2015). Furthermore, unattended departments are those with the highest growth of young population and the lowest educational enrollment at the same time (MEN, 2016b).

While the net enrollment rate for rural secondary education has increased by 16 percentage points (from 36% to 52%) between 2005 and 2013 (Cruz et al., 2015), there were still more than 1.1 million children in the range of 5 to 16 years old who were not enrolled in the school system in 2013, out of which 70% lived in rural zones (MEN, 2013). Other education indicators show similar patterns: for example, the grade repetition rates indicate that one out of every ten students

in urban municipalities (9%) fail Grade 1 and one out of every eight (13%) in rural areas (Cruz et al., 2015). Besides, the survival rate to the last grade of upper secondary education (from Grade 1 to 11) amounts to 82% for students enrolled in urban schools and only 48% for students in rural institutions (MEN, 2013). Similar to rural areas, remote country's regions have been dramatically affected by the armed conflict over the past decades. Thus, it is not surprising that the Andean and Caribbean regions, where the main cities are located, are those that exhibit more participation in compulsory education (Barrera et al., 2012).

Dropping out is a chronic problem after primary school. The weakest transition is from primary to lower secondary, that is, from grade 5 to 6 when a large number of students leave the education system (Sánchez, Velasco, Ayala, & Pulido, 2016). At the level of upper secondary education, low net enrollment is accompanied by high dropout rates. The restricted access to upper secondary could be explained by the high cumulative dropout rates in previous levels (García, Maldonado, & Rodríguez, 2014), as well as the fact that a significant number of children never enter the schooling system at all (OECD, 2016a). Other associated problems are late entry to school and high levels of grade repetition, which not only affect academic achievement but also increase the risk of dropping out (Sánchez, Velasco et al., 2016; Sarmiento, 2006). Recently, there has been a moderate improvement of graduation rates from Grade 11, which is explained not because dropout rates from upper secondary are decreasing but because more young people are enrolling at Grade 10 (García, Maldonado, & Jaramillo, 2016). As a result, completion rates in upper secondary education remain inefficiently low – 66% in 2010 (UNICEF, 2016)[92] – and dramatically well behind OECD member states, where about 80% on average of the corresponding age group had successfully completed upper secondary already in the late 1990s (Teichler, 2001).

As for the gender gap, differences between men and women are becoming less marked across levels of education over the past decades. By 2014, percentages of female enrollment at pre-primary, primary, and secondary education levels showed values approaching 50%, with a slightly smaller representation of female students in the first two levels.[93] Nonetheless, female students are less

92 Percentage of young people aged 3–5 years above upper secondary graduation age who have completed upper secondary education.

93 The percentage of female students should be analyzed carefully as it is a simple and limited way to judge gender parity, particularly in those cases when gender distribution in the target population is not identical to 50% (UIS, 2020a).

likely to abandon secondary school than their male counterparts (Sánchez, Velasco et al., 2016).

As a result of these deficiencies, and despite educational attainment has increased at the national level – mean years of schooling have raised from 6.5 to 8.1 between 2004 and 2015 for individuals aged 25 years and above – two main problems persist. On the one hand, as regards educational attainment, Colombia is still behind most Latin American nations. In 2015, the country was slightly above Brazil, but below Venezuela, and Chile (more than 10 years of attainment on average), Peru (more than 9 years), as well as Ecuador, Uruguay, Mexico, Costa Rica, and Bolivia (UIS, 2020a). On the other hand, educational attainment is distributed disproportionately among socioeconomic strata. Data from the 2010 National Household Survey indicate that individuals from strata 1 households have 5.2 years in average while those in strata 6 reach 12.7 years (García, Maldonado, & Rodríguez, 2014), which means that people from the lowest strata achieve to complete primary education, while highest strata individuals reach more than upper secondary education. Finally, shortcomings in universal coverage, a wide variation between gross and net enrollment, and high repetition and dropout rates, have had critical consequences in poverty levels and social inequality in the country (Barrera et al., 2012).

Low Performance in International Assessments

From an international perspective, Colombia spends more on education but gets lower performance in student assessments than the majority of OECD country members and partners. As observed in international standardized tests such as PISA, the national scores are well below countries with similar or less spending on education as a share of GDP (e.g., Israel, the United States or New Zealand have a budget comparable to the one of Colombia). In comparison with other Latin American countries, Chile and Mexico spend less and obtain better results than Colombia. Conversely, Argentina and Brazil also spend less than Colombia but have a similar performance (OECD, 2013).

In the last wave of PISA, Colombia ranked 58 out of 79 countries in the average score, and was located at the sixth position among nine Latin American countries. Table 6 summarizes the mean scores by subject (reading, science, and mathematics) among the participating nations from the region in 2015 and 2018. The table highlights alarming figures: only 1.5% of Colombian students perform at level 5, none of them reach the top level 6, and 39.9% of students do not even achieve the baseline level of proficiency in basic competencies. These results

reveal that more than a third of 15-year-old students in the country face considerable problems to understand, use and reflect on written texts, and do not demonstrate the scientific nor mathematical knowledge and skills that will enable them to participate actively in society as well as solve problems in life situations.

Table 6: Average scores by subject of Latin American countries in PISA (2015, 2018)

	Reading		Science		Mathematics		Proportion of students	
Country	2015	2018	2015	2018	2015	2018	High achievers*	Low achievers**
OECD mean	493	487	493	489	490	489	15.7	13.4
Chile	459	452	447	444	423	417	3.5	23.5
Uruguay	437	427	435	426	418	418	2.4	31.9
Costa Rica	427	426	420	416	400	402	0.9	33.5
Mexico	423	420	416	419	408	409	1.1	35.0
Brazil	407	413	401	404	377	384	2.5	43.2
Colombia	**425**	**412**	**416**	**413**	**390**	**391**	**1.5**	**39.9**
Argentina#	425	402	432	404	409	379	1.2	41.4
Peru	398	401	397	404	387	400	1.4	42.8
Dominican Republic	358	342	332	336	328	325	0.1	75.5

Source: Author's calculations based on data from OECD (2016d, 2019b).

Notes: Countries are ranked in descending order of the mean reading score in PISA 2018, which had a special focus on this subject.
*Proportion of top performing students (at level 5 or 6) in at least one subject of PISA 2018.
**Proportion of low achievers (students who do not reach the baseline level 2) in all three subjects of PISA 2018.
#Results for Argentina in 2015 are not comparable since the sample did not cover the full target population, due to the potential omission of schools from the sampling frame (OECD, 2016c, p. 81).

Regarding the performance of Colombian students across time, some improvements can be observed.[94] In 2006, all nations of the region were located in the bottom quarter of the average scores' distribution with Colombia having the lowest results in mathematics and science. According to PISA results between 2006 and 2012, two groups of participating Latin American nations can be identified:

94 Annex B includes a comparison of national scores in all three subjects over the last five waves of PISA (2006, 2009, 2012, 2015, and 2018) with other five participating Latin American countries (Argentina, Brazil, Chile, Mexico, and Uruguay).

those high-performing (Chile, Uruguay, and Mexico) that have shown moderately better results than other nations in the region, but far from the OECD average; and those low-performing (Argentina, Brazil, and Colombia).[95]

In 2015, however, while the first group showed slightly better scores to previous years, with Mexico being the least improved, the country that improved the most in the second group was Colombia, with an increase of 20, 28, and 40 points in the average scores in mathematics, science, and reading, respectively. The enhancement in science scores between 2006 and 2015 by Colombian students was one of the strongest increases among PISA participating countries – by eight points on average every three years since 2006 – although the national mean score in mathematics is still one of the lowest (OECD, 2016c). By 2018, Colombia's reading and science performance was below that observed in the previous PISA wave. Yet, mean performance improved in all subjects since the country first participated in 2006. The most recent national scores are similar to those of students in Albania, Mexico, the Republic of North Macedonia, and Qatar (OECD, 2019c).

Despite the progress observed, a measurement issue regarding PISA scores requires attention. In that respect, Ferreira and Gignoux (2011) point out that in countries where educational coverage at secondary level has not reached universal enrollment, the population of 15 year-olds is less likely to attend school than in OECD economies, thus excluding substantial numbers and leading to sample selection bias. According to this, Colombia's performance may be probably overestimated, due to the underrepresentation of pupils from underprivileged backgrounds. Therefore, PISA results for the Colombian case should be analyzed carefully. On the whole, the most striking observation from the regional comparison is the persistent, low national performance. Moreover, these results seem to be a trend also found in other international assessments (García, Maldonado, & Rodríguez, 2014), such as PIRLS,[96] TIMMS or SERCE.

95 For a detailed review on the performance of Latin America countries in PISA 2006 and 2009, see Gamboa and Waltenberg (2012).

96 For a comparative analysis of the cases of Colombia and Argentina, ranked 31st and 30th respectively, out of 35 participating countries in PIRLS 2001, see Wößmann and Fuchs (2005).

Academic Achievement Gaps

While enrollment in all educational levels has increased, this progress has not been matched by improvements in educational outcomes. The low learning outcomes of Colombian students described before are also confirmed by the results in national tests: from the census of upper secondary students who took SABER 11 in 2013, 80.7% performed at levels 'low' and 'intermediate', while only 19.2% reached the 'high' level (CESU, 2014).

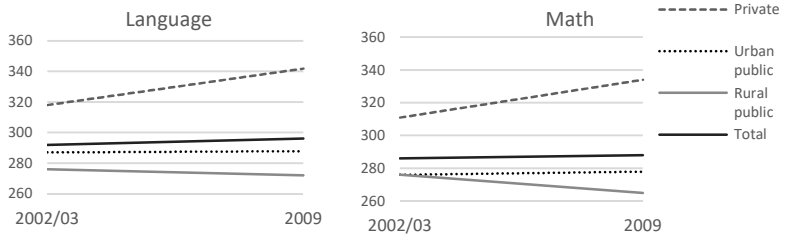
Also, the analysis of the different SABER tests' scores has consistently revealed the existence of marked inequalities in the distribution of learning outcomes within the country. Aggregated figures steadily show patterns of outcome inequalities among students from different socio-demographic characteristics (e.g., socioeconomic background) but also among those grouped according to a number of provision characteristics, mostly related to sector and location (e.g., rural/urban area, geographical region or department). Thus, individual, school, and education system's factors often overlap in the unequal distribution of learning outcomes. It should be keep in mind that the figures on educational inequalities outlined here are just a brief summary and do not necessarily imply a causal association; they are based on the perspective of inequality of outcomes.

Gaps in educational outcomes among students from different socioeconomic background are the most frequently analyzed. In all SABER tests, those from higher socioeconomic levels consistently achieve better scores than their counterparts from low income families. Gender differences are expressed in scores by subject: girls obtain better scores in language and lower in mathematics than those reached by boys on average and in all educational levels. Regarding the characteristics of school, the public/private division is of crucial importance for educational outcomes. Despite the key role of the public sector in achieving universal educational coverage, especially in primary education, public schools show critical difficulties in quality issues. Low levels of achievement in both international and national examinations by Colombian public schools is a tendency showed in all subjects and across time. In 2013, 68% of private school's students performed above average, compared to 32% in public schools. In contrast, 32% of public school's students performed below standard, compared to 16% in private schools (OECD, 2016a).

Another school factor playing a key role in the unequal distribution of educational outcomes is the school location. Overall, rural schools obtain substantially lower scores in all SABER tests than schools in urban centers (Barrera et al., 2012). Considering the school sector and area together, private education is

mainly concentrated in urban areas, which are the more densely-populated ones. As a result, the public sector absorbs the totality of students living in rural zones, as in most Latin American countries (Pereyra, 2006). Graph 3 shows the performance of students by school sector and area in language and mathematics in SABER 5 test in 2002/2003 and 2009. From the graph we can note that the total average scores show minor improvements. However, there is a stark difference in the performance between public/private sectors, regardless of area and subject. The differences between scores in public schooling in urban/rural areas are smaller but also significant. Over the years, the private sector performance has greatly increased, while the urban, public institutions exhibit scores well below their private counterparts, with only a slight increase over the same period. Interestingly, the rural, public schools not only have the lowest but also declining scores. In sum, it seems then that achievement gaps are increasing by school sector and area.

Graph 3: Average scores in SABER 5 test by school sector and area (2002/2003, 2009)



Source: Adapted from MEN (2013, p. 5).
Note: Test scores are only shown for two components: mathematics and language.

5.2.3 Summary

From the description above, three main conclusions could be drawn. First, the progressive expansion of the national education system has maintained coverage in a high degree in the case of primary education, and has improved coverage in lower secondary education. Despite this progress in access to compulsory education, there is still a long way to go in the case of upper secondary education, in which low net enrollment rates are combined with high dropout and repetition rates. Likewise, an uneven distribution of enrollment across regions, departments, and areas is also problematic in not achieving more participation, and

more importantly, in maintaining social inequalities in the country. These disparities become even more marked when individual factors such as socioeconomic background or gender are taken into account.

Second, performance of Colombian students in international standardized tests is considerably inferior in comparison to their peers in OECD countries and top-performing Latin American nations. Although results have lately shown some improvement, a great proportion of students do not have the baseline level of skills required for actively and productively participating in society. The deficient levels of basic competencies achieved by students are a matter of major concern when looking at the distribution of learning outcomes within the country, which leads a concluding remark.

Third, national learning results mask vast disparities associated with ascribed characteristics of pupils, but also with factors related to educational provision, such as school sector, area, and department. Despite important progress has been made in narrowing gaps in achievement, aggregated data indicate inequality of conditions at the primary and secondary education levels, with the more vulnerable individuals scoring low and dropping out. In sum, from the very first grades, the Colombian education system produces not only low but also unequal learning outcomes in basic competencies.

5.3 Higher Education: Features and Trends

This section deals with the current situation of Colombian higher education by presenting its main features of structure and its main trends of functioning. It is organized in four parts. The first part considers the following issues of higher education provision: levels of programs, types of institutions, and student assessment. Many other important elements (e.g., governance, funding, management, academic production and staff, among others) will not be addressed, though. The second part reviews the most prominent processes undergone by the national higher education system over the last decades. Those processes constitute important transformations related to size, institutional typology, and sector that account for trends in enrollment. The third part gives an overview of indicators on student access, achievement, and inequality of outcomes in higher education. It presents figures on the distribution of participation and completion, as well as on student academic achievement in national tests. This part ends by discussing some quality issues of the higher education system. Finally, the last part summarizes the main conclusions of this section.

5.3.1 Provision of Higher Education

Levels of Higher Education Programs

Higher education in Colombia offers programs at the ISCED levels 5 to 8. The short-cycle non-university higher education (ISCED 5) is known as technical and technological education (T&T) and includes two kinds of programs: technical professional and technological. In general terms, they last between 1.5 to 3 years, the former being shorter and with a lower degree of specificity than the latter. Technical professional programs aim at training students in occupations that have an operational or instrumental component. Upon successful completion of these programs, the student receives a certificate as *Técnico profesional* in a certain area or occupation. After graduation, the student also has the option to undertake a specialized technical program (*especialización técnica)* in the same occupation or area. Technological programs have the objective to train students in certain occupations, professions or disciplines with an important emphasis on application and practice. Upon satisfactory completion of these programs, students receive a technological degree with the title *Tecnólogo* in the respective area of studies. Graduates from these programs have the choice to continue with a bachelor's program, with the recognition of some credits completed in the previous program. Likewise, there are also specialized technological programs (*especialización tecnológica)* in the particular occupation, profession or discipline.

ISCED level 6 corresponds to professional undergraduate programs (*pregrado profesional)* leading to a bachelor's degree, which include four- and five-year programs, depending on the discipline and/or the institution.[97] Overall, they prepare students for a certain profession or discipline in the areas of technology, science, humanities, liberal arts, and philosophy. Although categorized in the country as ISCED 6, the length, objectives, and requirements of the five-year study programs are equivalent at the international level to a master's degree or second cycle degree (in the terminology adopted by the Bologna Process). For that reason, there have been several initiatives to shorten these programs, mostly from the private sector.[98] Students that successfully complete a program of level

97 With the exception of professional degrees in medicine that last six years.

98 For instance, Bachelor's programs in the private Universidad de Los Andes are frequently shorter than those equivalent programs offered by the public Universidad Nacional. Programs in Business Administration, Industrial Engineering, and Psychology have a theoretical duration of 8 semesters in the former university and

6 are awarded the title *Profesional* in the respective discipline or knowledge field. In the case of liberal arts, the certificate states *Maestro*, and a bachelor's in education awards the title of *Licenciado*.

While ISCED levels 5 and 6 lead to first degrees in higher education, ISCED levels 7 and 8 correspond to 'postgraduate' education. Level 7 includes professional specialization programs (*especializaciones)*, master's degrees, and medical specialties. The minimum requisite to enter a postgraduate program is holding a first degree of level 6. Professional specializations are short programs (with a duration of two semesters on average) for graduates to advance and be updated in their occupation, profession, discipline or complementary areas. Specializations are only valid in Colombia and do not possess any international recognition. Master's programs are mainly focused on research and have a duration of three to four semesters. Medical specialties consist of a multiple year residency for those graduates who have completed medical school. These specialties can last between three and six years, depending on the branch. The highest level, ISCED 8, corresponds to doctoral programs that last 8–10 semesters.

Types of Higher Education Institutions

There are four existing types of HEIs in the country, which are defined according to the level of programs offered (see Table 7): (i) professional technical institutions (*instituciones técnicas profesionales*) offer training for professional technical programs; (ii) technological institutions (*instituciones tecnológicas*) provide both technical and technological programs; (iii) 'university institutions' (*instituciones universitarias)* offer bachelor's degrees and 'specialization' programs; and (iv) universities that have a wide range of undergraduate and graduate programs. Whereas university institutions are allowed to offer programs at ISCED levels 5 to 7 (only specialization programs at the level 7), universities can teach all kind of programs from 5 to 8 ISCED levels. Thus, a certain HEI in higher category can give programs of lower categories, but not vice versa.[99]

10 semesters in the latter. This seems to be a pattern across private/public universities.

99 Later modified by the Law 749/2002 (CRC, 2002), which confers to both technical and technological institutions the possibility to offer bachelor's programs (ISCED 6) through propaedeutic cycles in the fields of engineering, management, and information technologies derived from programs of previous levels of education (ISCED 5) already offered by the institution.

Table 7: Types of higher education institutions by ISCED levels and programs offered

Type of HEI	ISCED level	Programs
(i) Technical institutions*	5	Technical programs
(ii) Technological institutions	5	Technical / technological programs
(iii) University institutions	5	Technical / technological programs
	6	Bachelor's degrees**
	7	Specialization programs
(iv) Universities	5	Technical / technological programs
	6	Bachelor's degrees**
	7	Specialization programs
	7	Medical specialty programs
	7	Master's degrees
	8	Doctorate degrees

Source: Own elaboration.
Note: *Abbreviated from professional technical institutions.
**Graduates from bachelor's programs from either university institutions or universities are the target population of this study.

Additionally, there are two special types of institutions participating in the supply of higher education that are not included in the table, as they are not considered HEIs but 'service suppliers' of education. The first type corresponds to the centers of the National Training Service (*Servicio Nacional de Aprendizaje: SENA*[100]), which are in charge of promoting training in productive activities by offering short courses as well as programs at the ISCED levels 4 and 5. The second type are called Regional Centers of Higher Education (*Centros Regionales de Educación Superior*: CERES), which were launched in 2003 with the purpose of expanding relevant higher education programs in underserved regions. They work in alliance with HEIs, local government, productive sector, and SENA. While CERES is part of the higher education system, SENA is not. Yet, the latter will be integrated in the National System of Tertiary Education that is currently under creation by the MEN. As observed, a cutting line between the binary division between university and non-university institutions is blurred in the particular case of Colombia, where different types of HEIs can offer the same level of educational programs (Brunner et al., 1995). The number of HEIs by sector and

100 SENA is responsible for the National System of Education for Work and its main mission is to offer comprehensive training in productive activities. SENA offers programs at different levels of education: vocational upper secondary, professional technical, technological, and non-formal education (known in Colombia as 'education for work and human development').

type will be provided further in this section in the context of the system's structural changes over time.

Student Assessment

As mentioned earlier in this chapter, the country has developed reliable instruments for quality assessment of educational provision. At the level of higher education, a set of national standardized tests was introduced in 2003 by the ICFES, under the name of State Examination of Higher Education Quality (ECAES for its Spanish acronym). Nowadays, the tests known as SABER PRO[101] assess the performance of all higher education students enrolled in bachelor's programs, who have already accomplished 75% of the total credits. Since 2009, the exam became compulsory for graduation. It constitutes an innovative tool as standardized assessments of competencies in the international context have been mainly developed for primary and secondary education but not at the level of higher education.

Nevertheless, while SABER 11 results are widely used for policy and research matters, SABER PRO has had a more limited scope. The instrument's specificity by field of study and successive changes in early years, have made comparisons across institutions, programs, and cohorts difficult. Recently, however, the exam's structure has been simplified for analytic purposes.

5.3.2 Structural Changes of the Higher Education System

Over the last decades, the national higher education system has experienced vast quantitative, structural changes. The processes of expansion, accompanied by a marked institutional differentiation and a pattern toward privatization, have had a decisive impact on enrollment indicators. This subsection briefly shows the trends of the higher education system considering those macro-structural processes and their impact on enrollment. It ends by giving an overview of the progress towards quality assessment in Colombian higher education.

Although the exposition about the structure and development of the national higher education system could begin with the origins of Colombian higher education, a historical review exceeds the present purposes. A review of that kind has been provided extensively elsewhere (e.g., Burbano, 2008; Soto, 2005) and an analysis of the evolution of the national policies in higher education has been

101 For a detailed description of SABER PRO exam, see Annex A.

also the object of several studies (e.g., Henao & Isaza, 1999; Jiménez & Figueroa, 1999; Lucio & Serrano, 1992). Annex C offers a brief summary of the origin and early expansion of the first national universities, while Annex D provides some figures on the size and growth of the higher education system over the past twenty years.

Accelerated Expansion

Whereas *universal* higher education has become a global trend in affluent nations, a rapid process of *massification*[102] at this educational level occurred in most countries in Latin America over the last decades of the 20th century (Guzmán-Valenzuela, 2016) and has continued in the present century (Rama, 2009). An accelerated expansion of the Colombian higher education system took place between 1960 and 1990, whose driving forces have been summarized by Henao (1999, cited by Quiceno, Sáenz, & Vahos, 2004, p. 166) in the following three aspects: a geographical decentralization of access, the increasing participation of women (from less than 20% to more than 50%), and the growth of enrollment in flexible methods of study, such as part-time, evening, modular, and distance/blended programs that allow students to combine work and study.

National higher education underwent substantial changes during the 1980s and 1990s. One of the most salient structural changes promoted by law during this period was the classification of institutions and programs into types and levels, respectively (described in the previous section). At the end of the 20th century, while there were more than 80 universities (see Graph C.1 of Annex C), the non-university HEIs amounted to more than 170, resulting in a total enrollment that exceeded 750,000 students (Henao & Isaza, 1999). Despite this dramatic growth, Colombia had one of the lowest net enrollment rates (14%) in Latin America by 1995 (Gómez, 2015). The higher education reform also promoted the self-regulation of HEIs with lesser state control, which in turn produced a proliferation of new higher education programs and institutions of all kinds, particularly at the technical and technological levels. Even though T&T education has been conceived as a key element for increasing enrollment by means of the institutional differentiation of higher education provision, it is important to analyze both the positive and negative sides of this expansion.

102 An overview of the terms *universalization* and *massification* of higher education was provided in Chapter 3.

As for the positive aspects, increasing enrollment has yielded impressive results. Since 2016, more than 2.2 million students have registered per semester in one of the national undergraduate programs, that is, a gross enrollment rate higher than 50% (see Table D. 1 in Annex D). Graph 4 shows the rapid rise of the total enrollment rate in ISCED 5–6 levels over this century. Similarly, the *absorption rate*[103] – i.e., higher education students enrolled in first-semester programs over the number of students who took the SABER 11 test in the previous year – arose considerably from 21% in 2000 to 53% in 2010 (Sánchez & Márquez, 2012). This growth has been related to the participation of first-generation students in higher education coming from low-income households: 80% of freshmen belong to families with an income below 3 monthly minimum-wage salaries[104] (TBY, 2015).

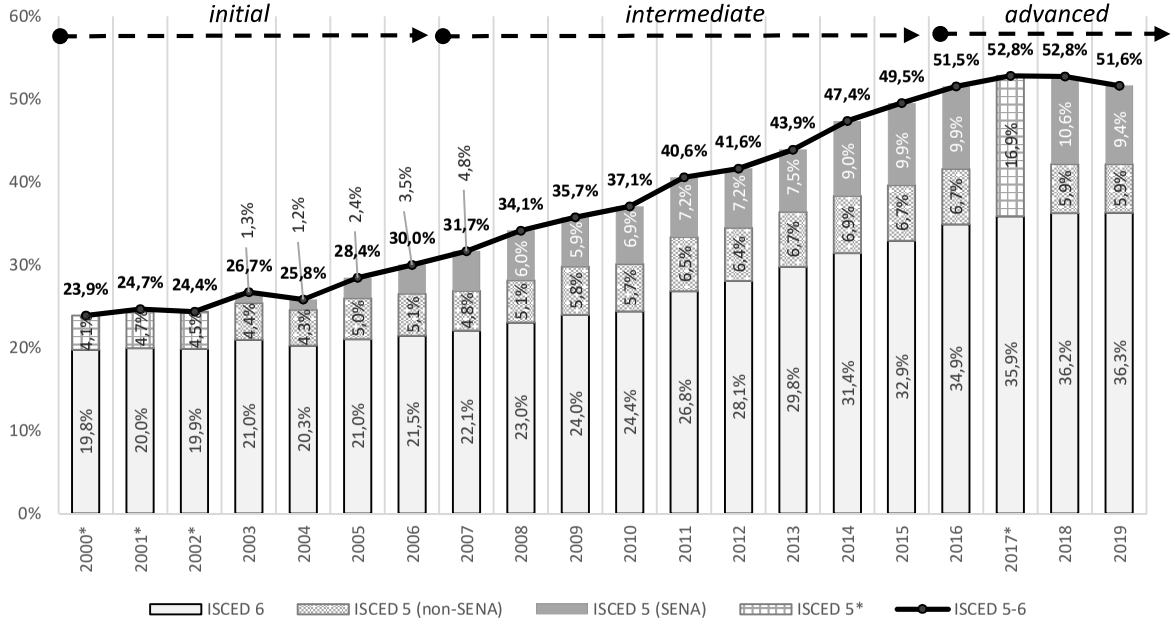
In spite of considerable progress in expansion, three main controversial issues need to be mentioned. First, even though in just nine years the country has shifted from a degree of *intermediate* massification in higher education (34.1% in 2008) to one classified as *advanced* (51.5% in 2016) – as shown in Graph 4 following the categories by Brunner et al. (2005) – it still lags behind leading regional peers in gross enrollment rates, such as Chile (83%), Argentina (79%) or Uruguay (76%). Just until 2011 national gross enrollment rate was for the first time higher than the Latin America average (World Bank, 2015).

Second, the figures above should be examined carefully. Gross enrollment ratio refers to the total number of students registered in ISCED 5–6 programs (i.e., technical, technological, and bachelor's programs), regardless of age, expressed as a percentage of the corresponding official age-group population (i.e., 17- to 21-years-olds for the case of Colombia). The increase of this indicator is to a large extent due to the progressive expansion of technological education, which accounted for 12% of the total higher education enrollment in 2000 and went up to about 27% by 2017, rising the number of students from approx. 110,000 to more than 600,000 in that period (see Graph D. 1 of Annex D for more details).

103 Nowadays called by the MEN as *immediate transition rate* (SNIES, 2020). It should be noted that the existence of considerable differences in this indicator between national statistical reports – e.g., SNIES (2014) shows higher figures than SNIES (2019) for the same years – might be due to recent measure changes.

104 1 monthly minimum-wage salary in Colombia by 2015 was COP 644,350 equivalent to USD 235 (OECD, 2020a).

Graph 4: Gross enrollment rates in higher education, ISCED 5–6 levels (2000–2019)



Source: Own calculations using data from DANE (2020) and SNIES (2020).

Notes: *For 2000–2002 and 2017, information on enrollment at ISCED 5 differentiated by SENA/non-SENA programs was not available in the sources checked. Dashed arrows denote degrees of massification: initial, intermediate, and advanced (Brunner et al., 2005).

Such an impressive growing participation in technological programs has been partly the result of a series of policy initiatives since the beginning of the present century, supported particularly by international agencies (OECD/World Bank, 2012), towards the expansion of the higher education system through strengthening T&T provision. The efficiency of these policies is, however, called into question when looking at the steep decline in the number of students attracted by technical programs. Technical education comprises just a small share of the total enrollment in higher education (3.4% by 2019), which is even lower than that in the beginning of the present century (4.4% in 2000), with negative annual change rates in enrollment for various consecutive years (see Graph D. 1 in Annex D). Although this trend could be due to the upgrading of some programs from technical to technological, a closer examination is required.

In addition, under the purpose of expanding higher education, established as a priority in both national and international policy agenda for education,[105] the Colombian Government started to introduce the figures of SENA programs into the enrollment indicators of higher education. As illustrated in Graph 4, if we only attend to participation in bachelor's and T&T programs excluding SENA, the current gross enrollment ratio would be about 42% in 2019 instead of 51.6%, corresponding to a degree of intermediate massification. According to Gómez (2015), this strategy constitutes an 'artificial inflation' of figures because SENA programs were conceived as technical and vocational education and training,[106] and they are not part of the higher education system in the strict sense. In fact, the SENA operates independently from the MEN under the regulation of the Ministry of Labor, and should, perhaps, more realistically be considered an institution operating at the ISCED level 4. Although this strategy has positively impacted coverage as the SENA provides more than half of the T&T programs, thus getting closer to the national development goals, it has also brought adverse consequences for quality, as will be discussed further below.

105 For instance, the 2006–2016 *Plan Nacional Decenal de Educación* – which constitutes the country's navigation chart for education every ten years – had set the goal of a gross enrollment rate in higher education at 50% by 2016 (MEN, 2007), which was successfully accomplished according to official statistics. More recently, and aligned with the international agenda, the national strategy for implementing the United Nations' Sustainable Development Goals has resolved to rise this indicator at 80% by 2030 (DNP, 2018).

106 Technical and Vocational Education and Training (TVET) is "used as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life." (UNESCO, 2020).

Finally, a third noteworthy point is the recent decline of enrollment at undergraduate level. In contrast with the overall expansion of the system, enrollment at this level has started to show a decrease. While the annual growth rate of bachelor's enrollment remained in a range between 3.4% and 6.3% in the period 2005–2015 (except for extreme change rates during 2010–2011), from 2017 onward it has decreased progressively, which for the first time exhibits numbers around and below zero (please refer to Graph D. 2 of Annex D). In fact, the national gross enrollment ratio in the last four years has shown minor variations and even diminished in 2019 to the same size to that in 2016 (51.5%). This phenomenon has been largely related to the fact that fewer students have registered in first-year undergraduate programs as compared to previous years (see figures in Graph D. 3 of Annex D), which has been a matter of wide discussion in the public opinion and a growing concern among private universities.[107] This is a relevant issue that deserves special scrutiny for designing more realistic and feasible education policy goals, even more so in a challenging environment marked by the recent pandemic outbreak. In this context, enrollment is expected to drop considerably from the end of 2020 onward.

Institutional Differentiation

The accelerated expansion of the higher education system in Colombia has been accompanied by changes at the institutional level. Three of these changes are identified here: (i) establishment of new and diverse types of institutions; (ii) enlargement of the existing universities; and (iii) elevation of institutional status.

Institutional differentiation of higher education in Colombia started with the first non-university HEIs founded during the 1960s and 1970s. As an alternative to the academic programs of traditional universities, the non-university institutions offered short-duration programs oriented towards the labor market needs (Gómez, 2015). Over the 1980s, a number of institutions and programs of all kinds grew exponentially. With the Law 30/1992, these programs were regulated

107 To my knowledge, this phenomenon has not been systematically studied yet. Some of the hypotheses circulating in national media (Brando, 2020; Dinero, 2019; El Tiempo, 2020; LEE, 2020; Semana, 2019) include: curtailment of youth population in the country, high cost of tuition in private institutions, a shift of financial aid schemes addressing exclusively high-quality accredited programs, suspension of attractive scholarship programs such as *Ser Pilo Paga*, low expectations of higher education returns and employability, growth of virtual provision, international university programs with competitive tuition fees, promotion of entrepreneurship and occupational certifications, among others.

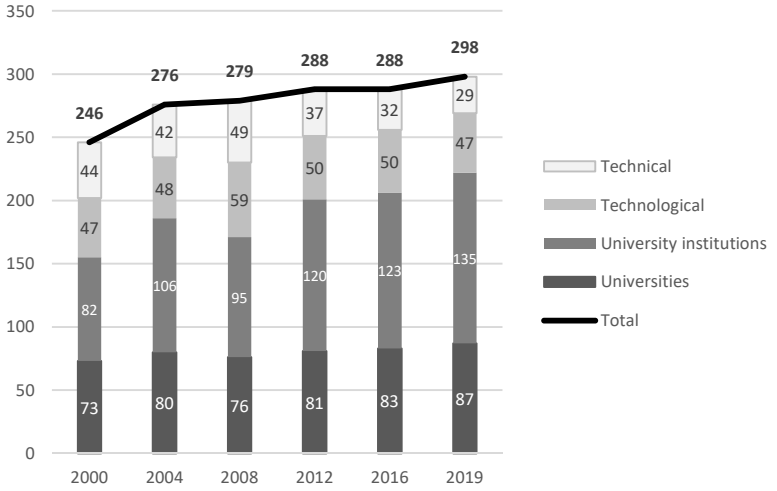
and the types of HEIs were classified according to the level of programs they were allowed to offer. Accordingly, Colombia's current higher education system "is more complex than most" (OECD, 2016a, p. 253). There are currently four types of HEIs offering six different levels of programs, as described earlier.

The period between 1992 and 2002 – from the enactment of the Law 30 until the establishment of the national quality assurance system of higher education[108] – is recognized by some analysts as the "lost decade" (Gómez, 2015, pp. 163–183). In this period, the diversification of the higher education system has led to a proliferation of institutions, mostly private, which has raised concerns over the minimum quality conditions under the concept of self-regulation. This deregulated extension gave additional opportunities of higher education for Colombians but of questionable quality (Orozco, 2005), as will be further discussed in this section.

From 2003 onward, the number of new institutions and new programs in existing universities has increased steadily, although at a more moderate pace than in the preceding years, partially due to the gradual introduction of a group of regulatory strategies by the state. As observed in Graph 5, new institutions have been created between 2000 and 2019, most of them university institutions (53), and some universities (14). By contrast, the amount of technological institutions has remained the same and in the case of technical institutes the number even decreased – a phenomenon presumably connected to the drop in T&T enrollment exposed earlier. Currently, there are a total of 298 HEIs, distributed by type as follows: 76 T&T institutes, 87 universities, and 135 university institutions, which account for 45% of the total of HEIs.

108 A description of the quality assurance system of higher education is found in the last part of this section.

Graph 5: Number of higher education institutions by type (2000–2019)

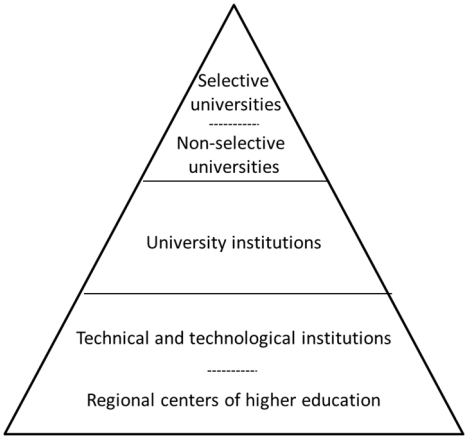


Source: Own elaboration with data from MEN (2017) and SNIES (2017, 2020).

Beyond *formal dimensions* of institutional differentiation, there is also a hierarchical classification of institutions based on substantial differences related to *informal dimensions* (Teichler, 2004), such as the degree of selectivity of students, academic prestige, social reputation, and quality issues. This hierarchy in the Colombian case can be illustrated in a pyramid (see Figure 8), following the one suggested by Gómez (2015, p. 33). Those HEIs recognized as universities by the MEN would be located at the top of the pyramid. Within this group, two subgroups can be identified: in the first place, the traditional selective universities, highly regarded as institutions with academic and social status. Second, the non-selective universities, which share structural characteristics with the former, but still do not reach high levels of research production and whose programs are of less prestige. At the bottom of the pyramid would be the T&T institutions – including CERES – whose programs are frequently undervalued, in contrast with the social overvaluation of the classic university programs. Typically, the T&T institutions have a small size, poor infrastructure, low-qualified teaching staff, and demand lower SABER 11 scores for admission. Lastly, the 'university institutions' would be located in an intermediate position within the pyramid, be-

tween the universities and the T&T institutions. Although these professional-oriented institutions offer ISCED 6 programs (and some of level 7), they do not reach an academic identity and seek to 'transform' themselves into universities.

Figure 8: Hierarchy of types of higher education institutions in Colombia



Source: Adapted from Gómez (2015, p. 33).

Over the last years, less prestigious HEIs have tend to raise their status by becoming more similar to the patterns and characteristics of the selective universities, a phenomenon known as *academic drift* (Neave, 1979). Since the implementation of Law 20/1992, several university institutions have been recognized as new (non-selective) universities. Similarly, despite the relevance of T&T institutions in the development and consolidation of the Tertiary Education System, many of them are seeking to upgrade themselves to the 'university institution' type instead of becoming excellent providers of T&T programs (OECD/World Bank, 2012). After an explosion in the system's size through a marked institutional differentiation, the trend seems moving towards a process of *homogenization*, in which institutions at the bottom of the pyramid are fewer and fewer, while institutions in the middle struggle to get a spot at the top. The extent of diversity vs. homogeneity in higher education within and across countries has been a widely discussed topic, especially with the emergence of global trends in standardization of procedures, such as: quality assurance, university rankings, teaching evaluation, knowledge production, accountability, and internationalization, among others. Some experts, however, have often emphasized the downside of this homogenization to inclusion and equity, inasmuch as higher education would

lose capacity to respond to a diverse student body – also in terms of motives, talents, and job perspectives (Teichler, 2003).

Towards Privatization

The growing participation of the private sector at this level of education can be analyzed in different aspects. This subsection examines four of those aspects: (i) the origin and size of the private sector; (ii) the number of private institutions; (iii) the share of private expenditure; and (iv) the tuition costs of private programs.

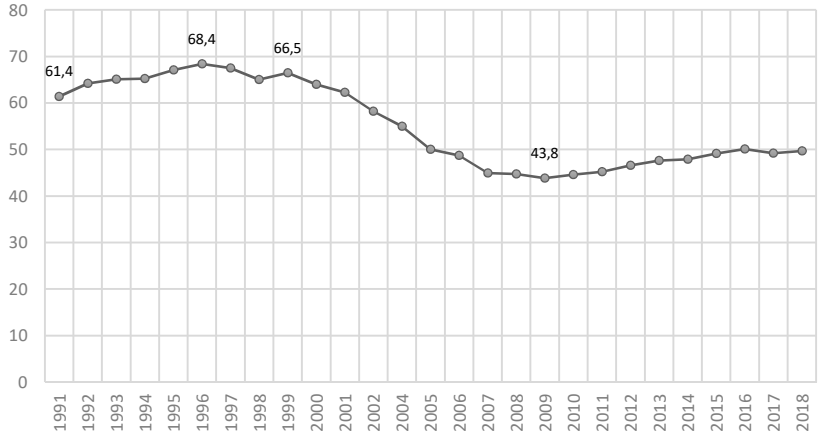
A Large and Old Private Sector

In Colombia, the presence of the private sector in higher education dates back to the colonial period, as documented in Annex C. Contrary to the first universities established in America – in Mexico, Peru, and Santo Domingo – those founded in Colombia in the 16th and 17th centuries were of private character. Colombia has not only the oldest private higher education in the region but one of the largest, with a private enrollment around 50%, together with, Chile (84%), Brazil (73%), Peru (72%), and Costa Rica (50%) (UIS, 2020a).

With the spread of private institutions of all kind during the 1960s–1970s, the private enrollment in higher education has grown progressively. In particular, in the 1990s it grew exponentially reaching a maximum peak at 68.4% in 1996 (see Graph 6). During the first decade of the present century, there was a substantive reduction of the percentage of private enrollment (from 66.5% to 43.8%).[109] However, since 2010 there has been a reactivation of the private sector at a slight but steady pace. A possible factor related to this increase may have to do with the latest promotion of loan programs as the main strategy towards the encouragement of higher education access among low income students.

109 An analysis of the underlying rationale of this decline exceeds the chapter's objectives. A discussion on this issue in Colombia is brought up by Uribe (2015), who points out that this unexpected downfall fits with the global findings in which declines of private sector are seen to exist for certain time periods.

Graph 6: Percentage of private enrollment in higher education (1991–2018)



Source: Own calculations based on data from IESALC (2002) and UIS (2020a).

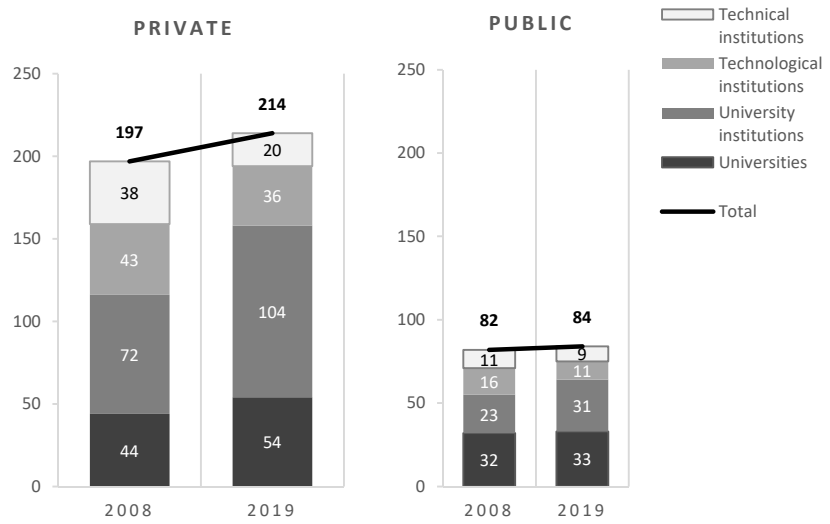
The great participation of the private sector in higher education enrollment contrasts with the public/private distribution at the primary and secondary education levels, showed in the previous section. This is a relevant matter to consider among students and their families when making choices in the transit from secondary to higher education, as the high cost of private training is a main constraint to staying in the education system upon completion of school.

Numerous Private Institutions

By 2019, 214 institutions out of 298 HEIs in Colombia were private, that is 72%. Looking at the type and sector combined, the amount of private HEIs is particularly elevated in the case of university institutions, which account for 35% of all national institutions at this level of education. As illustrated in Graph 7, the total number of HEIs has increased by 19 between 2008 and 2019, but when looking at the distribution by sector and type, there is a clear tendency towards private expansion. With the exception of T&T institutions that have been reduced in both sectors, private university institutions increased by 32 and private universities by 10, while their public counterparts did it by one and eight, respectively. From this concentration of university institutions together with the gradual reduction

in T&T institutions, it would appear that a process of elevation of institutional status is a recurring practice, particularly in the private sector.

Graph 7: Number of higher education institutions by sector and type (2008, 2019)



Source: Own elaboration using data from MEN (2017) and SNIES (2014, 2020).
Note: Public HEIs also include here those institutions with a 'special regime, that is, institutions publicly funded through their affiliation to state bodies belonging to non-education sectors, but that are allowed to offer higher education programs, such as: *escuelas militares* (Ministry of Defense), SENA (Ministry of Labor), *Instituto Caro y Cuervo* (Ministry of Culture), etc.

The growing sub-group of new, private university institutions can be identified as demand-absorbing, low-cost, non-elite institutions. Perhaps this is the most common type of private HEI for the late 20th and early 21st centuries in Latin American countries and other developing nations (Levy, 2006). In the competition to attract more students, these private HEIs rapidly grow by adapting themselves and diversifying according to a specific segment of the population they focus on. As a result, the number of these institutions is increasing as much as the low-income students enter to higher education. The new private non-university HEIs tend to be "entrepreneurial" as they operate as private businesses and are more sensitive to the market changes (Altbach, 1999, p. 112). Typically, they are teaching centered, offer a limited educational service, and do not promote

research activities. As in other countries in Latin America, these private HEIs do not offer programs in science, technology, engineering, and mathematics (the so-called STEM disciplines) nor postgraduate studies with a research orientation (Brunner et al., 1995). Instead, they focus on fields of high demand and reduced investment, such as management studies, educational sciences, computer science or law.[110]

High Private Expenditure on Higher Education

As participation grows, more provision and resources are needed to meet this demand. As the state in many countries is no longer capable to cover this expense, private provision of higher education has been growing while families have assumed this burden (Guzmán-Valenzuela, 2016). Indeed, the share of private funding is strongly related to the level of tuition fees charged by HEIs. In countries were tuition fees tend to be low (e.g., Austria, Finland, Iceland or Norway), the private share of expenditure in higher education is also low (less than 10%) (OECD, 2019a).

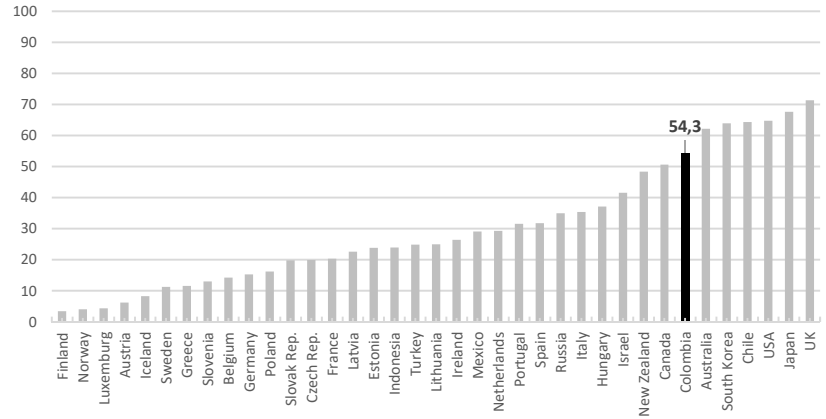
Nowadays, the share of private spending in Colombia is one of the largest worldwide. In 2016, although private funding on primary, secondary, and post-secondary non-tertiary education accounted for 10% of expenditure across OECD countries, it exceeded 20% in Colombia. At the higher education level, more than half of funding in Colombia comes from private sources, a characteristic that shares with a group of countries that also tend to charge students high tuition fees, as shown in Graph 8: Australia, Canada, Chile, Japan, South Korea, the United States, and the United Kingdom. Despite recent national efforts to increase public funding on higher education, the private sector remains larger.

According to Gómez (2015), public resources are allocated among HEIs differently: 75% of the total public spending in higher education is concentrated on just ten public universities and less resources are allocated to non-university institutions. With a few exceptions (e.g., Massachusetts Institute of Technology in the US and similar institutes in countries such as China, Germany, South Korea, Netherlands, India, Japan or Singapore), non-university higher education receives a poor financial aid from the state in most societies. This is also the case in Colombia, where short-cycle public HEIs receive less funds from the state

110 Colombia is the second country in the world with the highest number of lawyers per 100,000 inhabitants (354.5) after Costa Rica (389.4), followed by Italy, Brazil, Argentina, Canada, United Kingdom, Spain, and Portugal with figures ranging from 332 to 260. Among the countries with lower rates in this indicator are France, Sweden, and Russia with 76, 50, and 44, respectively (JSCA, 2009).

than the traditional research universities, which in turn reinforces their low prestige and quality.

Graph 8: Share of private spending on higher education in selected countries (2015)



Source: Own elaboration based on data from OECD (2020b).

The expansion without a parallel growth in state resources threatens the quality of instruction and research of the public sector (Trow, 2000). The public enrollment growth in Colombian higher education combined with the reduction of public HEIs and an increasing but low public spending, might have perverse consequences for the public sector. For instance, during the period 2003–2010, when a growth in the public enrollment occurred, the Government persuaded several public universities to increase access by using similar amount of resources than previous years. As an immediate result of this, students at non-selective public HEIs located in peripheral regions were the most affected as tuition fees became more expensive than those at HEIs in urban large municipalities (Uribe, 2013), thus producing great regional imbalances in the provision of education. As public universities can barely extend their capacity, private elite universities strengthen in turn, exhibiting more outstanding performance in academic and research production indicators. In effect, Colombian private universities progressively tend to perform better than the public ones in recent international and regional higher education rankings.

While at primary and secondary levels, public education is free of cost, tuition fees in public HEIs are of relative low cost, but depend on the family's socio-economic stratum and income.[111] For example, fees at bachelor's level in the (public) National University of Colombia – which are conditioned to the current monthly minimum wage – varied from zero to a maximal amount of approx. USD 2,340 per semester by 2020.[112] In contrast, private institutions are fully funded by students' fees, which are about six times those in public institutions (OECD/World Bank, 2012). What private universities charge for a bachelor's program fluctuates in a wide range from USD 340 to USD 6,700 per semester (SNIES, 2020) – an amount that has risen faster than inflation over the last years, to the extent that private tuition was 20% higher in 2018 than that in 2009. These figures are impressive taking into account both national and international parameters. Despite the country's monthly minimum wage for 2020 stood at just USD 237 (COP 877,803), Colombia is located in the 7th position among OECD member and partner nations – where data are available – with the highest annual tuition fees on average (OECD, 2016b).

Furthermore, tuition fees are highly differentiated. In the case of Colombia, this probably reflects the divergent returns on wages by field of study, program level, and institution. For instance, T&T programs are often low-cost, bachelor programs such as Medicine have high tuition fees at private HEIs,[113] and the master's programs are three times higher than those for first-degree programs (OECD, 2016b). A possible contributing factor to the stratified character of the Colombian higher education system is that this differentiation of fees is not always correlated with the quality or value of the education provided, but with the public/private sources of funding (OECD/World Bank, 2012) as well as to the academic status and prestige of certain institutions and programs.

111 Despite the large increase in numbers of students, Colombian public HEIs resist to charge higher tuition fees. However, due to the underfunding, the government developed a project of Reform Law 30 in 2011, which included the proposal of increasing fees in public higher education. Nevertheless, due to great opposition among different members of the national academic community, especially from the student' side, against for-profit education, the bill was withdrawn from the Congress.

112 Calculated as the product of the highest factor applied for those high-income families, which is a fixed value established by the regulatory framework (CSU, 1993), and the monthly minimum wage (SMMLV).

113 Tuition fees of Medicine programs at private HEIs can vary between 7.62 and 29.7 SMMLV per semester (OUC, 2017), equivalent to USD 1,903–7,424 in 2017.

Heterogeneous Quality

A comprehensive discussion on what quality in higher education is and how it is measured is outside the objectives of this book. Nevertheless, some indicators of institutional quality are considered here, as they are key elements for the empirical exercise conducted in the present study. SABER PRO results are one of these indicators that allow monitoring student achievement in higher education on a regular basis. Trends in academic achievement of higher education students in this test are summarized in the next subsection.

The most important tool in quality assessment of higher education is the national quality assurance system. At present, high-quality accreditation of HEIs and programs is the main objective indicator of quality of provision in Colombia. In addition to national efforts to measure quality, cross-country comparisons in higher education have identified a group of three characteristics often associated with high-quality higher education: selectivity of students in admission process, progression to postgraduate studies, and qualifications of academic staff (OECD, 2016a). The following paragraphs consider four quality-related issues in higher education: (i) quality assurance system; (ii) student selectivity; (iii) postgraduate studies; and (iv) staff qualifications.

A Few Accredited Institutions

The quality assurance system of higher education relies in two instruments, namely: the Register of Qualified Programs (*Registro Calificado)* and the High Quality Accreditation (*Acreditación de Alta Calidad*). The Register is mandatory for all existing institutions and programs of higher education, which must be registered in the MEN and be updated every seven years. Those that receive the official recognition status can offer study programs and award degrees with the specified minimum quality requirements. The accreditation consists of a peer review process, which is voluntary for those HEIs and programs interested in acquiring additional recognition status. The high quality accreditation certificate is valid from three to ten years. While the register demands HEIs to undergo regular inspections and quality assurance procedures, accreditation is often seen as a better indicator of institutional quality.

Table 8 shows the progress in number of accredited HEIs by type over a 6-year period. Although the number has doubled in this period, the share of institutions recognized with high-quality accreditation is still low: less than 23% (for a complete list of HEIs with this recognition to date, please refer to Table D.2 of

Annex D). When disaggregated by institutional type, percentages of accreditation are concentrated on one type of HEI: universities. While one-third of them were accredited in 2013, two-thirds have achieved accreditation some years later. Albeit this impressive progress towards quality, this is not the case for other HEI types. From the total of 135 university institutions, only ten are accredited nowadays. Very few T&T institutions (none of them technical) have achieved high quality accreditation status. A similar pattern is found in the accredited programs by level, being the university programs those that hold 82% of all program accreditations (CESU, 2014). Furthermore, when looking at the distribution of institutional accreditation by sector: from the group of high-quality accredited HEIs, there are 39 private and 29 public. Yet, when comparing these numbers to the total of HEIs by sector, another picture emerges: whereas 35% of public institutions have achieved accreditation, only 18% of private institutions did. These figures indicate the existence of heterogeneous quality and standards among higher education institutions and programs, which has raised concerns particularly on the T&T programs and those offered by many CERES (OECD/World Bank, 2012).

Table 8: Accredited higher education institutions by type (2013, 2019)

	2013			2019		
Type	**Number**	**Accredited**	**Percentage**	**Number**	**Accredited**	**Percentage**
Universities	81	27	33.3%	87	55	63.2%
University inst.	119	2	1.7%	135	10	7.4%
Technological	50	4	8.0%	47	3	6.4%
Technical	36	0	0.0%	29	0	0.0%
Total	286	33	11.5%	298	68	22.8%

Source: Own elaboration on the basis of CESU (2014) and (SNIES, 2020).

The large disparities in the accreditation status of higher education provision are partly due to the weak regulatory mechanisms since accreditation is not compulsory for all active HEIs and programs, but a voluntary process. Those mechanisms are not enough to stop the great development and increasing of institutions with heterogeneous quality (Quiceno et al., 2004). As a consequence, this "heterogeneity in accreditation aggravates inequalities in access, since vulnerable populations are more likely to attend lower-quality programs and institutions" (World Bank, 2017a, p. 10). The 'lower-tier' HEIs in Colombia, often called 'garage universities', operate as demand-absorbing, teaching-oriented HEIs that typically are located in metropolitan areas, offer flexible study programs, serve

small groups of students, and have academic staff with low qualifications working under contracts per hour.

Furthermore, the accountability requirements for private HEIs are not sufficient to ensure transparency in the processes of financial arrangements (OECD/World Bank, 2012). Thus, it is sometimes uncertain whether they actually operate on a non-profit basis, as they should by law. With the adoption of the new Law 1740 in 2014 (CRC, 2014), the MEN seeks to take more control over the activities carried out by the HEIs and initiated inspection processes in several institutions, resulting in official cautions, financial penalties and closing down of the institution in some cases. To date, the MEN has given around 100 penalties between 2012 and 2020, and 47 cessation orders in the last five years (MEN, 2020).

Because students and their families have limited information on the quality of unaccredited higher education institutions (88% of the total of HEIs in the country), the main source of information is in international rankings. However, the most comprehensive academic ranking in the region – the *Quacquarelli Symonds Latin American Top 50 Ranking* – included in 2020 only 5 national universities on the list, standing the Universidad de Los Andes at the 4th position and the Universidad Nacional at 10th. In light of these limitations, the MEN has recently developed a multidimensional national ranking for HEIs, the Model of Higher Education Performance Indicators (MIDE), in order to provide comparative information on key dimensions of institutional quality (Montes, Forero, Salas, & Zarama, 2017). Although this model constitutes a potentially useful tool for providing relevant information on higher education quality, it has not escaped criticism and has been strongly challenged in some crucial points that deserve attention, especially when it comes to the use of rankings as a basis for policy decisions (OECD, 2016a; OUC, 2015).

Nevertheless, the issue of quality should be examined very carefully. For instance, since the accreditation process is mostly focused on institutional research production, the low quantity and quality of research and innovation are often a constraint for many non-university HEIs which are not research oriented (World Bank, 2017a). Therefore, "it cannot be assumed that all unaccredited institutions and programs are of poor quality" (OECD, 2016a, p. 255).

Highly-Selective Elite Institutions

Colombian students who succeed in entering upper secondary education are less vulnerable, as they possess a smaller number of characteristics associated with high risk of leaving school (García, Rodríguez, Sánchez, & Bedoya, 2015).

Among those who receive the upper secondary certificate, only 30% of youth make the transition to higher education (OECD, 2016a). As already discussed about performance in SABER 11 test, the overall low levels of competencies achieved by school-leavers indicate that they are not well-prepared to enter and succeed either in work or in higher education. Indeed, they are younger and have lower educational standards than their counterparts in competing countries. Consequently, half of those who enter higher education drop out before completion of a program.

Elite universities are very selective in that they admit only the best performing students and exclude those without academic preparation, thus preserving the best overall retention and graduation rates. A high SABER 11 test score is usually the gateway to selective universities. Besides admission standards, these institutions are geographically concentrated, have a high proportion of full-time Ph.D. staff, and great expenditure per student. By contrast, HEIs located in lower positions in the pyramid are less selective, as they adapt to the high demand and the needs of students with deficient college readiness and low resources.

Low Enrollment in Postgraduate Programs

Postgraduate enrollment in Colombia has increased three-fold in the last two decades, but it still remains low: 187,637 students that account for less than 8% of the total higher education enrollment in 2019 (see Graph D.3 in Annex D). Despite the growing supply of postgraduate programs in the country, and the increasing participation in master's and doctoral programs, enrollment tends to concentrate on specialization programs (62%), which in general – and apart from medical specialties – are shorter, cost less, exhibit heterogeneous quality, and do not have international recognition, albeit they might make a difference in the labor market. The high cost tuition fees associated with postgraduate programs in Colombia seem to be an obstacle for many to continue through this path. Whereas in most OECD countries HEIs charge similar tuition fees regardless of the program level – especially in the public institutions – in Colombia, the difference of tuition fees between bachelor's and master's programs is substantial and a lot higher than in countries like Australia, Korea or the United States (OECD, 2016b). Lastly, very few individuals progress to ISCED 8 level. Nowadays, the number of students enrolled at national doctoral programs (6,572) is 20 times the number at the beginning of this century. However, the share of Ph.D. students from the total tertiary education enrollment is negligible (0.3%), even when compared to similar countries in the region: Chile (0.5%), Argentina (0.8%), Mexico (1%), and Brazil (1.3%) (UIS, 2020a). Overall, the low number

of highly-skilled researchers has had a negative impact on country's research production and innovation.

Low Staff Qualifications

Quality of teaching and research are key factors commonly associated with high-quality provision of higher education. Data on credentials of academic staff in Colombia suggest considerable quality concerns: in 2015 professors with master's or doctoral degrees accounted for 29% and 6% of academic staff at HEIs respectively (SNIES, 2016), a small proportion well below OECD countries. Also, research indicators show that academic production remained underdeveloped: Colombia is one of the countries in South America with the lowest production of articles indexed in the Science Citation Index (14 per 100,000 inhabitants in 2018): Argentina (28), Brazil (28.6), Chile (62.5), and Uruguay (43.5) (RICYT, 2020). In light of these shortcomings, government policy has focused lately on increasing the number of staff with postgraduate qualifications and encouraging research.

5.3.3 Some Indicators of Resources, Process, and Results

Unequal Distribution of Access and Completion

Despite the progress in expansion, Colombia faces a number of inequalities in higher education related to the unequal participation of social groups according to socioeconomic conditions, country's departments and regions, and rural/urban areas. Even with the increasing participation of students from low-income households, substantial inequalities remain in the country in terms of access (Melguizo, Sanchez, & Jaime, 2011), but also of the largest dropout among students from poorer or less well-educated families, and those from under-represented regions (OECD, 2016a).

The first major issue is the socioeconomic gap: only 10% of those in the poorest quintile were enrolled by 2014, in contrast to 59% of the richest quintile. Furthermore, data from the SPADIES (System for the Prevention and Analysis of Higher Education Dropout) show a socioeconomic pattern in the student composition by HEI type: on the average, 86% of students from strata 4 to 6 enrolled in higher education go to universities, while 12% of them attend university institutions, and only 1% attends T&T institutions. By contrast, for students from 1

to 3 strata enrolled in higher education, these percentages are distributed as follows: 70% in universities, 24% in university institutions, and 3% in T&T institutions[114] (SPADIES, 2017).

Also, higher education enrollment is highly concentrated in some regions of the country, namely: in the capital city and in 4 out of 32 departments (Antioquia, Valle, Atlántico, and Santander), which taken together represent about 65% of the national total enrollment (MEN, 2016c). The rural/urban gap is even more marked at this level of education: whereas 60% of the population in the main cities are enrolled in a higher education program, only 13% are in the rural areas (World Bank, 2017a). One of the many regional inequalities within the country is expressed in the available options for secondary graduates to pursue a higher education program. For instance, while school leavers in Bogotá have a choice of 280 accredited programs, those living in Sucre just have two options of quality programs. For that reason, those coming from peripheral regions who decide to transit to higher education, have to face additional difficulties as finding resources to travel to or live in another region where there is the educational supply of their choice. As a result, they have greater likelihood of dropping out (OECD, 2016a).

As for the gender gap, the values for both groups are similar at the ISCED 5 level, and interestingly, more female students are enrolled at ISCED 6 and 7 levels (54%) in comparison to male students. By contrast, the participation of women in doctoral programs has increased over time, but it is still reduced at 39.5% (UIS, 2020a). The rise of female participation in higher education – yet not in the highest degrees nor in STEM careers – seems to be a common international trend.[115] This partly reflects the changing values and attitudes towards the benefits of higher education for women, but not necessarily means equality in the labor market in terms of salaries and decision-making positions (UIS, 2014). Also, new concerns may appear around low levels of participation in higher education among men (De Ferranti et al., 2003), associated with the risk of being involved in violence and armed conflict in certain rural regions. Furthermore, there is a pattern in graduation rates by gender: more women than men graduate

114 Figures here do not include enrollment in SENA programs.

115 Apart from South and West Asia and sub-Saharan Africa. In 2010, Colombia was among the seven countries in the world (together with Chile, Guatemala, Hong Kong, Mexico, Swaziland, and Switzerland), where gross enrolment rate in higher education – excluding doctoral programs – was equal for women and men (UIS, 2010). Currently, the trend of this indicator in Colombia seems to favor women over men.

from ISCED 5, 6, and 7 programs (52%, 57%, and 56% respectively), while only 38.2% of Ph.D. graduates are women.

Very high dropout rates make the higher education system considerably inefficient compared to international standards: on average, one of two higher education students does not complete the program (Melo, Ramos, & Hernández, 2014). The risk of dropping out varies by type of HEI, the T&T institutions being more inefficient: dropout rates are 45%, 54%, and 62% in universities, technological institutions, and technical institutions, respectively. In addition, dropout rates have increased over the last years, which could be explained by the socioeconomic and academic vulnerability of the new cohorts (Sánchez & Márquez, 2012). Another factor that may have contributed to this increase is the growing number of students from low-income families who are progressively entering T&T programs.

It has been argued that one of the main causes of the high dropout rates in higher education is the lack of 'college-readiness' of Colombian higher education entrants, especially in basic competencies, such as language, reading, and abstract reasoning. These elements constitute a disadvantage for underprivileged students, who are more likely to enroll in non-selective HEIs in low-cost fees' programs that can be held in night classes (Misas, 2004). This is an urgent problem in itself for reasons beyond the success in higher education, as it entails negative consequences for the formation of a qualified labor force and a democratic society.

Academic Achievement Gaps

On average, Colombian students exhibit low performance in all modules assessing generic competencies, particularly in numerical reasoning, writing skills, and English proficiency. An analysis of a national report of SABER PRO results (2012–2015) shows that male students perform better in all modules of generic competencies in comparison to women, except for the module of written communication. Public HEIs students obtain higher scores in all generic competencies relative to their private counterparts. In turn, students from private HEIs are more likely to score much higher in the English module, yet differences are not significant (ICFES, 2016). Moreover, students at university programs perform better: 14% at the highest level of quantitative reasoning and critical reading, compared to 6% of students in non-university HEIs (OECD, 2016a).

5.3.4 Summary

From the review in this section, four main conclusions can be drawn. First, the higher education system in Colombia has considerably expanded in recent decades, reaching a status of intermediate massification. As the system of higher education has grown, its structure has also changed, particularly because expansion has also been accompanied by institutional differentiation. In addition, the high participation of the private sector in higher education has also played a key role as a factor of expansion, but also of differentiation among programs and institutions. As private institutions have multiplied rapidly, the share of public institutions diminishes while struggling to maintain high enrollment rates and accreditation standards, but without a significant increase of resources.

Second, the formal institutional differentiation combined with informal dimensions of variation – such as quality and prestige issues – have produced a hierarchical stratified system, which can be characterized as composed of three main types of HEIs. First, there are a few, elite, selective, research-oriented universities, from both public and private sectors, that offer high-quality accredited programs. In the middle position stand the non-selective universities that do not reach quality standards, but intend to be similar to the first ones. In this group, the participation of the private sector is rapidly growing while some peripheral public universities remain deficient and pauperized. At the bottom, there are numerous lower-tier, demand-absorbing institutions that offer short and market-oriented programs. These mostly private, non-university institutions do not aim at offering specialized high-quality T&T training, but fulfilling the minimum requirements to gain a higher position within the institutional hierarchy.

Third, the structural changes have led to significant improvements in access for the less privileged strata of the population, in absolute numbers and also in relative figures at the national level; yet, enrollment rates still have lagged behind those of the Latin American peers. Despite improvements in access as a result of the massive expansion, marked inequalities in the distribution of access, completion, and achievement persist, mostly by socioeconomic background, country department, and rural/urban area. Also, dropping out represents the major barrier for underprivileged students who reach to enter higher education.

Fourth, as educational inequalities in 'quantity' have been slightly reduced, horizontal inequalities have not been mitigated by the educational expansion. To the contrary, educational inequalities seem to have been strengthened by the highly segmented character of educational provision. The foundation of new

HEIs in rural areas with deficient resources has been a measure to assure coverage in peripheral places, but only at the expense of a moderate quality of programs since there was no qualified staff to teach there (Misas, 2004). Higher education presents a hierarchical scenario characterized by diverse programs and institutions, in which poor students are most likely to attend those higher education paths of moderate quality. As a result, they frequently achieve both academic and occupational outcomes at a lower level than more affluent individuals. In sum, providing access to higher education is a necessary but insufficient condition towards equalization of opportunities, since expansion without quality produces a false illusion of inclusion and social equity (Gómez, 2015).

6 The Empirical Study of Educational Inequalities in Colombia

The following pages contain an overview of the main findings on IEO from previous national studies. Providing a complete review of the national literature on IEO is not only a demanding task, but an unproductive effort in collecting abundant, if not disconnected, findings from diverse perspectives, methods, levels of analysis, and scope. The purpose of this literature review is twofold. First, it aims at identifying the most relevant factors associated with educational inequalities in the country at both secondary and higher education levels. They will serve as basis and justification for the selection and construction of the variables to consider within the model developed for this study in Chapter 7. Second, the empirical findings summarized here will be taken into account when discussing the results of the empirical exercise in Chapter 8.

The chapter is divided into four sections. The first and second sections summarize the most prominent studies in the national context addressing the O-E and O-E-D associations and their corresponding findings, respectively. The third section is dedicated to empirical works on stratification and higher education in Colombia. The fourth section identifies the main research gaps within the empirical works on educational inequalities conducted with Colombian data, and concludes by refining the research questions of the present study in light of the theoretical approaches exposed in Chapter 4.

6.1 National Studies on the O-E Association

6.1.1 Sociological Research on IEO

The empirical educational research from a sociological perspective has not developed in Colombia at the same rate as the theoretical and methodological progress of the sociology of education as a field. One reason for this backwardness has to do with the fact that the educational research topics in the country mainly arise from the need to solve immediate problems and provide rapid answers to state bodies or other stakeholders. The resultant publications of these applied studies frequently contrast with the works of scholars within the area of educational sociology. On one hand, these works tend to have a critical perspective, construct elaborated theoretical frameworks, and seek to identify the social mechanisms behind certain educational processes that sometimes imply changes in the fundamentals of the social structure (Cataño, 1980). On the other hand,

national sociological studies on stratification and education have tended to disregard quantitative approaches. In a review of the national literature, Vélez (1988) found a few studies from a sociological perspective on the topic but none of them provided any empirical evidence to support the discussion.

Since the beginning of this century, however, important developments within the field have been made thanks to the academic production of some specialized research groups in the country (e.g., Gómez, Celis, Díaz, & Bautista, 2014). Despite their valuable contributions to relevant topics with both a substantive analytical elaboration and a clear focus on educational policies at the levels of secondary and higher education levels, their works are predominantly of three kinds: theoretically-oriented analyses, literature reviews, and evaluations (Gómez et al., 2014). Some other empirical works consist of case studies mainly based on qualitative data.

Historically, studies on educational inequalities in the country have mainly focused on inequalities of outcomes. The works by García and Quiroz (2011) and Sánchez and Otero (2012) are good examples of this, in that they, through descriptive or nonparametric statistics, clearly illustrate growing inequalities between socioeconomic strata in their educational conditions of access and achievement. The authors conclude that the national education system reproduces social inequalities at the origin, yet they do not use statistical tools to reach causal relationships in their analysis. One significant contribution in this direction is the work of García, Espinosa, Jiménez, and Parra (2013), whose results also confirm the reproduction thesis but from an explanatory level, by incorporating a discussion of some conceptual elements from sociology and distributive justice combined with the use of multilevel models when analyzing IEO with data of SABER 11. Nevertheless, national research in education from a sociological standpoint with an empirical-quantitative basis is still uncommon. And in particular, sociological studies on IEO, addressing empirically the association between ascribed factors and individuals' educational outcomes, are hard to find in the national literature. In recent years, scholars have been increasingly interested in the development of measures of IEO and have, for the most part, conducted works from an economic perspective (e.g., Gamboa, 2012; Gamboa & Waltenberg, 2012).

6.1.2 Research on Factors associated with Learning

Studies on educational inequalities in Colombia statistically addressing the relative effects of a set of variables on student achievement have been carried out within the framework of EER. Since its origins in the 1960s, the international

literature in the EER tradition has been progressively developed in number, sophistication, and methodological techniques. Nevertheless, a frequent criticism claims that most of these studies have been predominantly conducted in education systems from developed nations (e.g., Anglo-Saxon countries and Western Europe), and these trends are not seen in low-income countries, where the explained variance by the effect of school is much higher (Heyneman & Loxley, 1983; Piñeros, 2010): whereas in the former countries school factors explain between 10% and 15% of the total variance in achievement, in the latter these values are of 30% to 40% (Scheerens, 2004), which is apparently 'good news' for educational policy supporters, as schools would have a wide-ranging impact on students' outcomes.

A straightforward explanation of these differences would lie in the unequal distribution of school resources among countries with lower levels of development. Some other authors argue that in contexts with high inequality of conditions, as is the case of developing countries, the large magnitude of school effects could be due to the strong predominance of production-function variables, i.e., differences among school resources and which could barely be "expanded by including school organizational and instructional variables" (Scheerens, 2004, p. 2). The emphasis on school resources in these works has consistently revealed, among other things, the enormous discrepancy between private and public schools in Latin America.

Studies on EER in Latin America started during mid-1970s, but remained unsatisfactory in quantity and quality due to a number of reasons, especially because of the underdevelopment or underuse of new statistical techniques, as well as the lack of high-quality data (Fernández, 2004; Murillo, 2007). It was not until the beginning of the 21st century that important developments have been produced with the emergence of more ambitious studies. The EER tradition in Latin America is more advanced in Argentina, Brazil, Chile, and Mexico, and more recently in Colombia, in comparison to other countries in the region (Murillo, 2008a).[116]

The slow development of this research tradition in the region, however, has also to do with a misunderstanding of theoretical core concepts and objectives. As claimed by Murillo (2005), the very term "effective schools" has been inexactly translated into Spanish. *Escuelas eficaces* has been often confused by *es-*

116 One of the most comprehensive studies conducted in the region is the work of Fernández (2004) with data of Argentina, Chile, Mexico, and Uruguay, in which the author finds that the size of school effects is about 26–37%.

cuelas efectivas or *escuelas eficientes*, giving rise to negative connotations associated with managerialism among scholars, policy makers, and educators. Perhaps this is one of the reasons why this line of research in Latin America has adopted a different name: Research on Factors Associated with Learning (*estudios de factores asociados al aprendizaje*), hereinafter FAL. Although FAL comes from the EER, some authors (Treviño, 2015) have suggested that the former has surpassed the field of the latter, as it includes those works aiming at understanding under which circumstances learning occurs – that is, identifying the independent variables that determine student achievement beyond socioeconomic background, in terms of school factors as well as education practice and policy variables.

FAL studies were introduced in Colombia only in the 1990s (Piñeros, 2010). Overall, they are difficult to track, as many of them are written in Spanish in the form of reports and scarcely published in specialized journals. The reason for this is that most of them have been conducted with the purpose of an immediate application, as they are often financed by various stakeholders (e.g., governmental organizations, supranational agencies, NGOs, principals, among others) with concrete concerns and urgent results. During the end of the past century and the beginning of the current, the interest in FAL studies in Colombia decreased, due to a lack of confidence in standardized tests in general, and a lack of awareness of their direct application in policy reforms in particular (Piñeros, 2010).

Over the past years, however, there has been a resurgence and accelerated growth of this kind of studies, mostly due to the role of the ICFES in promoting research on the topic of educational quality, with the use of comprehensive administrative databases that include detailed information at the pupil- and school-levels. The ICFES is a specialized state institution that conducts educational assessment and supports the MEN in the design and administration of national standardized tests on academic performance at primary, secondary, and higher education levels (i.e., the SABER tests). It is also in charge of the administration in the country of studies that have been developed by both regional[117] and international agencies.[118] In recent years, the availability of impressive data sets on the performance of Colombian students in international, regional, and national tests sparked a rising interest among educational researchers. To date, the country

117 The three already conducted versions of the Regional Comparative Studies in Latin America, developed by the LLECE-UNESCO (*Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación*) are: PERCE, SERCE, and TERCE.

118 Colombia has participated in the following international educational surveys: PISA, PIRLS, TIMSS, CIVED, and ICCS.

has one of the strongest information systems in Latin America (OECD, 2016a), which collects not only test results but also multiple other survey data related to the national education system, such as infrastructure, enrollment, retention, staff recruitment, quality assurance, and transition into the labor market.[119] Despite the progressive improvements of data and management systems, national educational research has not been strengthened at the same rate. More efforts are needed to turn this information gap into an effective support for research and policy making. In addition, Colombia still faces a number of data quality limitations in terms of collection, use, and integration of the different data sets administered by various institutions, which are often poorly coordinated.

Major Findings of FAL in Secondary Education

The focus of this subsection is rather narrow; it is restricted to reviewing a selection of studies on FAL conducted with Colombian data. Studies were selected on the basis of three conditions: (i) works focused on upper secondary education, (ii) research dated from the end of the 1990s onwards, (iii) inclusion of appropriate statistical instruments to find relationships between variables, and (iv) compliance with basic validity and reliability requirements. Annex F lists the selected national studies, the data used, their scope, and the main variables under analysis.

The first column of the table in Annex F displays the authors and year of each study. Regarding the scope, there are studies at the national level but also some dedicated to country regions or cities, such as Bogotá, Cali or Cartagena. Most of them are based on data from standardized tests, including both PISA waves and SABER exams. The subsequent columns denote the type of factors analyzed in each study. These factors can be divided into two main groups: individual and educational factors. Individual factors include those attributes related to social origin. Educational factors are those related to the education provision in the strict sense, which can be categorized according to level of analysis: classroom, school, national education system, and context. As for the outcome variables, most of them analyze achievement in terms of scores obtained in standardized tests. Some of them, however, also examine other variables such as grade repetition and dropouts.

119 Colombia's information system on education is composed of a large number of tools and databases by different education levels and coordinated by diverse government bodies. At higher education, there are four systems. An overview of them is provided in Annex E.

Social Origin

Consistent with the international evidence, studies addressing the influence of individual factors on educational outcomes find a positive, strong, and significant effect of family variables on student achievement at all levels of education in the national and local contexts. This tendency seems to hold for all kind of measures of social origin (i.e., the family's socioeconomic standing). In the national research, social origin is traditionally indicated by variables on one or various characteristics of family's economic and/or cultural resources. In the selected studies of Annex F, while economic resources are typically measured as families income, socioeconomic status, or household conditions – parental occupation being less common – the cultural resources are measured as parental education and/or the possession of cultural assets at home such as number of books, computers, and access to Internet. Parental education is indicated here by the educational level attained by both parents, by one of them (more frequently that of the mother), or the highest level exhibited among the two. Overall, FAL studies in Colombia use more often socioeconomic background, household income or socioeconomic stratum being the most common measures usually understood as proxies. Although social background variables are of fundamental importance in studies of IEO, not all studies within FAL in the national context analyze the effects of social origin variables and some others just include them as controls.

A comprehensive measure of social origin is used by García, Espinosa, Jiménez, and Parra (2013) by way of a set of variables, including household income, socioeconomic strata, and family size. Additionally, they incorporate parental education and possession of Internet and computers at home, as a measure of cultural resources. Although the work title refers to social classes and education, strictly speaking the authors do not carry out any measurement of classes.[120] Among the factors of social origin, it seems that parental schooling has a stronger effect on individual's educational outcomes, especially the mother's credentials. In two studies by Gaviria and Barrientos (2001a, 2001c) with data from Bogota, parental level of education is found to have a substantial effect on student achievement in SABER 11. Similarly, average score increases with the mother's educational level in international tests such as PISA (Barrera et al., 2012).

120 Contrary to the European tradition, measurements of social classes are seldom found in national sociological studies with an empirical perspective.

School Factors

Until the beginning of this century, little research had been done on the school determinants of educational quality in Colombia (Wößmann & Fuchs, 2005). So far, financial, material, and human resource input variables (e.g., expenditure, teachers' characteristics, equipment, infrastructure, educational materials), as well as issues such as class size and time on task, are the most frequently investigated topics in the country (World Bank, 2008b). Instructional and pedagogical variables appeared to be practically missing in the national research on FAL. The following school or educational factors that appear as determinants of achievement in the national literature review will be discussed: school sector (i.e., private/public), student composition, teacher's characteristics, curriculum orientation (i.e., academic/vocational), instruction time (i.e., school day and school calendar), and location (i.e., rural/urban and country region).

School Sector: Public vs. Private

With a few exceptions, a specificity of Latin American education systems lies in the differences in performance by school sector. Several studies conducted in the region have shown large differences of average performance in all subjects of the PISA exams among students of both sectors, being scores of private schools substantially higher (e.g., Gamboa & Waltenberg, 2012). In Colombia, despite the considerable participation of the public sector in primary and secondary education enrollment, its impact on educational quality remains questionable. In view of that, FAL studies in the national context have largely focused on estimating the impact of attending private or public schools on performance. One of the first studies in the country on the basis of standardized achievement test scores (Cox & Jimenez, 1990) had already showed a clear trend of private schools' being at an advantage. Results consistently indicate a marked positive effect of the private sector on the students' academic performance in both national and international standardized tests, once individual family background is controlled (Barrera et al., 2012; Gamboa, 2012; Núñez, Steiner, Cadena, & Pardo, 2002). Likewise, Gaviria and Barrientos (2001a) concluded that public schools in Bogotá have an adverse effect on performance, especially in the case of high scoring students.

Despite this trend, a few studies have also found opposite results. For instance, Piñeros and Rodriguez (1998) using data of the capital city of Bogotá, revealed that public institutions achieve higher SABER 11 test scores in all subjects than their private counterparts, once socioeconomic background is controlled. This can be interpreted as that the advantaged socioeconomic level of

pupils from private schools compensates shortcomings in school quality. Similarly, Iregui, Melo, and Ramos (2007) concluded that although private institutions are, on average, more effective in terms of achievement, due to a more favorable learning environment composed of students from privileged families, when assuming a similar environment, differences in effectiveness levels between private and public schools tend to disappear.

While evidence suggests that school sector is correlated with differences in achievement levels, factors explaining the school sector effects on student performance are less clear (Rangel & Lleras, 2010). National studies have started to consider school resources and other attributes associated with sector that also may play a role. On one hand, some scholars have hypothesized that school sector may affect achievement since it is related to differences in school quality. In that direction, the work of Gaviria and Barrientos (2001b) estimated that, after controlling by family socioeconomic conditions, teacher qualifications, class size, and infrastructure had positive and significant effects on performance of pupils enrolled in private institutions – but negative in the case of public schools. On the other hand, other researchers claim that school sector may affect achievement through student composition – and its eventual effects on issues such as school climate, teacher expectations, teacher-student, peer relationships, etc.

Composition of the Learning Group

Recent studies indicate that the socioeconomic conditions of the student body seem to account for most of the achievement gaps by sector. In other words, the effect of social origin may be largely transmitted through schools, as school sector – and other institutional typologies – are often confounded with family socioeconomic background. As showed for Latin America (Gamboa & Waltenberg, 2012), primary and secondary students are distributed among sectors according to their socioeconomic condition: pupils from less favorable socioeconomic background traditionally enroll in public schools, while children from well-off families usually study in private schools with costly tuition fees.

In a literature review in Colombia, Sarmiento, Becerra, and González (2000) have already stressed that the relationship between the household's socioeconomic level and individual achievement is mediated by the school. The authors assert that "poor pupils go to some schools and rich pupils go to other schools" (p. 58, author's translation), to the extent that García and Quiroz (2011) have called to this phenomenon in Colombia as *educational apartheid*. Similarly, Gaviria and Barrientos (2001a, 2001c) show how more educated parents can af-

ford high-quality schools, which are associated with higher scores in standardized tests. On this point, Pereyra (2006) shows that 70% of students from private secondary schools in Colombia come from families whose parents have completed at least secondary education, while in the case of secondary students at public schools this percentage amounts only 38%. These findings support what was found by Rangel and Lleras (2010) in their work of the city of Cartagena, where social origin appeared to be mediated – at least – by school sector, school resources, and student composition. The authors conclude:

> While students in private schools have higher mathematics and reading achievement test scores, this is almost entirely due to the presence of more middle-class and affluent students and the differential allocation of resources between high- and low-poverty schools. (…) poor students in Cartagena experience a double disadvantage, that of social segregation exacerbated by school segregation, when it comes to educational opportunities and school quality (Rangel & Lleras, 2010, p. 311).

Teachers' Characteristics

One of the few studies addressing teacher characteristics (Gaviria & Barrientos, 2001b) shows that both teacher-pupil ratios and teacher qualifications are positively correlated with better student achievement, and that these associations are linked to private schools. In public schools, neither teacher-pupil ratios nor teacher education are associated with higher test scores. Taken together, these results suggest, according to the authors, that the effect of school factors on achievement is mediated through an incentive structure. Regarding teacher quality, Barón and Bonilla (2011) found that among Colombian graduates, those who perform low in SABER 11 tests have five times greater chances than the high performers to graduate from faculties of education at the university, which suggests that the national education system does not attract outstandingly performing young people to become school teachers.

These findings were later complemented by a systematic study on the role of teachers' characteristics in educational quality (García, Maldonado, Perry, Rodríguez, & Saavedra, 2014), which reveals that quality of public sector's teachers is deficient for two main reasons: low salaries and insufficient academic level of most faculties of education in the country. The first one discourages the high-performing students – who expect higher income – to enroll in a bachelor's degree in education, but conversely, the second factor attracts the academically-disadvantaged students to those programs which do not demand high scores for admission: nearly 20% of those who study education are in the lowest 30% of

the distribution of SABER 11 scores. In addition to deficits in the quality of teachers' training, there are also inequalities in the assignment and administration of teacher resources among country regions, and an ineffective incentive system that does not recognize the specific conditions under which teachers work.

Curriculum Orientation

As already described in Chapter 5, there is no tracking selection in Colombia as families are free to choose whether to send their children to vocational or general oriented upper secondary education. Nevertheless, the general-vocational curriculum distinction acts as an implicit tracking for student achievement, which may have important consequences "for future course selection and placement and for educational aspirations and attainment.… And this positive relationship persists even after family background and ability differences are controlled" (Hallinan, 1988, p. 260).

Public schools of both curricula orientations have the duty to receive all children (although they give priority to those from underprivileged households) without considering the student's abilities. In spite of that, Colombian students from high socioeconomic background are more likely to be placed in the general track, which is frequently offered by private schools and that are characterized by a more favorable student composition and a richer institutional learning environment. Conversely, the few vocational public schools with some prestige have limited admissions since places offered are always full and on a high demand. Furthermore, most families, especially those coming from low socioeconomic strata and rural areas, do not have many choices at hand as the educational provision is reduced to the closest school from where they live or the school with places left. In distant rural municipalities, the options are even scarcer as there is often only one public school, sometimes with a particular curriculum orientation.

National studies found that educational achievement in general (academic) oriented schools is higher than that of vocational schools (e.g., Barrera et al., 2012). A national comprehensive study on upper secondary education with recent data found evidence against this widespread assumption: García, Maldonado, Acosta et al. (2016) did not find any significant differences in SABER 11 scores and dropout rates among general and vocational public schools. In spite of these findings, the performance gap between general and vocational schools in favor of the former still remains when looking at both public and private schools, which might be explained by the fact that most private institutions offer the general track.

School Day

Educational research on FAL frequently highlights the inequalities among Colombian students due to differences in their school day.[121] National evidence shows that academic performance is higher in full-day schooling than in half-day schooling (Barrera et al., 2012; Bonilla, 2011a; Piñeros & Rodriguez, 1998). A study on the effects of lengthening the school day on student outcomes in Colombia (García et al., 2012) has found a significant reduction in dropout rates.

In spite of the efforts made by the Colombian government to offer public education in a single shift, most public institutions still have double daily shift. According to figures presented in Bonilla (2011a), at that time only 9% out of the total of upper secondary students going to public schools, attended full-day schooling. In contrast, this percentage in the case of students going to private schools increased to 43,4%. In any case, while there is a positive impact of extending school day on a wide range of variables (e.g., achievement, labor market outcomes, crime, and teenage pregnancy reduction), a recent thorough literature review in Latin America (Alfaro, Evans, & Holland, 2015) suggests that this is not, however, the most cost-effective intervention to achieve similar learning effects.

School Calendar

With the exception of some geographical regions such as Cauca, Valle, and Nariño, located at the southwest part of the country, most public schools work according to the A calendar. Private institutions can be either A or B, with the bilingual schools most likely to have B calendar. Only a small number of cases work on F calendar. A few empirical studies have also shown that the school calendar is also an institutional variable in the Colombian context that has an impact on student outcomes. For instance, Sánchez (2013) has shown that scores in English language of SABER 11 test obtained by students from B calendar schools are higher in comparison to A calendar schools.

121 Characteristics of instruction time in Colombian schools, such as school day and school calendar, were described in detail in Chapter 5.

Location

School location, as a context variable, is also a key characteristic regarding student achievement. Several studies on quality of education in Colombia have focused on the differences between urban and rural schools (e.g., Tenjo & Bernal, 2004), resulting in a better performance of students in institutions located in urban areas. Although the study by García, Maldonado, Acosta et al. (2016) did not find any differences due to curriculum orientation in upper secondary education, the authors conclude that the urban-rural gap is still wide regarding performance in SABER 11, dropout rates, and aspirations to enter higher education.

Empirical studies also evidence wide differences between geographic regions. For example, in a study on decentralization policies, Bonet (2005) found high educational inequalities between and within regions associated with disparities in the allocation of resources for public schools. A more recent study (Barrera et al., 2012) showed that the unequal distribution of the academic results in SABER 11 favors those who study at urban schools, in certain geographic regions, and belonging to the higher socioeconomic strata.

A final remark concerns the distinction between '*escuelas'* and '*colegios'*, which is frequently made in Latin America. Whereas the former name has been typically assigned to public, rural institutions, the latter is a more generic term (translated as 'school'), which is more often applied to private, urban institutions. In the midst of a long history of both social inequalities and institutional hierarchies in the region, school labels such as these articulate not only the private-public and urban-rural dichotomies, but also deep social disparities (Albornoz, 1993, cited by Benavot & Resnik, 2006, p. 33).

Altogether, studies on school factors tend to conclude that school effects on student achievement are significant yet reduced. Remarkably, Casas et al. (2002, cited by World Bank, 2008b) identified that school effects in Colombia were not only moderate but they were diminishing over time, presumably to changes in the ICFES instruments: from 27–37% between 1997 and 1999 to values around 10–27% by 2000. This is in accordance with an earlier study (Piñeros & Rodriguez, 1998) in which a measure of these effects was found to be 15–18% of the achievement variance in private schools and 12–16% in public ones. More recently, in a study for the major city of Cali, Correa (2011) observed significant between-school effects in explaining the variance of student performance (36%), but found that the size of individual variables had a stronger weight (within-school variance of 64%).

6.2 National Studies on the O-E-D Association

Research on Intergenerational Social Mobility

Research on social inequality in Colombia has largely focused on inequality of conditions. Over decades, quantitative studies on inequality have aimed at measuring the extent of the unequal income distribution in the country,[122] recently showing a clear emphasis on regional disparities (Bonilla, 2008, 2009; Cortés & Vargas, 2012; Galvis & Meisel, 2010, 2012). As for the research on social mobility, the first generation of studies in Latin America with an empirical basis appeared in the 1960s and were led by sociologists focused on occupational status (Torche, 2014), restricted to a few countries: Argentina, Brazil, Chile, Mexico, and Uruguay (Filgueira, 2001). After a halt during the 1980s, the study of the intergenerational transmission of advantage was reactivated in the mid-1990s, giving rise to the second generation of studies in the region, which include economic approaches of earnings and income mobility. Colombia, however, continued to be absent from this group of studies. As pointed out by Uribe (2005), mobility studies have not been developed in Colombia at the same rate as is in the Southern Cone, that is, the southern part of the Latin American sub-continent, partly because industrialization has been a less extended process and partly because a Marxist approach was dominant in the social sciences until the mid-1980s.

Although the first academic debates on social mobility in the country date back to the 1950s, studies on the topic have relied more on opinions and anecdotes than on data to support those statements (Angulo, Azevedo, Gaviria, & Páez, 2014). A first attempt of finding a balance between conceptual discussion and statistical evidence was the work of Urrutia (1974), who found a positive picture of social mobility through education. Nevertheless, estimations based on representative samples with Colombian data only appeared until the beginning of this century. From an economic perspective, mobility studies have explored the phenomenon – with a marked emphasis on intergenerational educational mobility – at the national level (Bonilla, 2011b; Cartagena, 2003, 2006; Nina & Grillo, 2000; Tenjo & Bernal, 2004) and in comparison to other countries (Angulo et al., 2014; Behrman, Gaviria, & Székely, 2001; Gaviria, 2002). Alto-

122 A literature review during the period between 1975 and 2010 is summarized in Ferreira and Meléndez (2014).

gether, these studies have come to the conclusion that social mobility in Colombia – measured either as educational or economic mobility – is very low when compared to other countries with similar levels of development. Although mobility seems to be on the rise – especially when it comes to educational attainment – it continues to remain low among Latin American nations. This pessimistic scenario presumably has to do with the immobility of some sectors of society. In this line, a recent study (García et al., 2015) indicates that despite educational mobility has improved over the past years, upward mobility is significantly low in the case of individuals from vulnerable contexts, characterized by extreme poverty, internal displacement, high proportion of Afro-descendants, and the prevalence of armed conflict. Furthermore, a prevalent finding of these studies is the significant impact of the parental education – particularly mother's education – on individual's outcomes. Other important factors in the determination of outcomes are country region (advantage for birth in Bogotá or the Eastern region), area, and municipality size (those coming from urban areas and big municipalities being relatively less vulnerable).

The absence of longitudinal data and panel studies with large-scale data has impeded the development of this research line in most developing nations (Buchmann & Hannum, 2001). In those Latin American countries with a sociological tradition in the empirical analysis of social mobility, studies have been largely conducted on the basis of cross-sectional samples of adult populations with retrospective questions about the socioeconomic and family conditions of the individual's household when the respondent was 15 years old.[123] In the case of Colombia, mobility studies have mainly used household surveys and the ENCV (*Encuesta Nacional de Calidad de Vida*: Survey of Life Quality).[124] Although these surveys include relevant information for analyzing socioeconomic mobility, they do not capture enough about educational aspects, such as achievement or educational institutions attended. On the other hand, SABER tests are a good

123 To the best of my knowledge, the only survey of this kind with the particular purpose of studying the O-E-D association is the one described in Vélez (1990) and Psacharopoulos and Vélez (1993) for a sample of 4,027 workers of Bogota in 1988.

124 This survey is the main source of information about socioeconomic characteristics of the population. It is representative at national level and includes the majority of regions. It measures the living conditions of Colombians including variables related to (i) housing characteristics, such as construction materials of walls and floor, and public utilities; (ii) residents' characteristics, such as education, health, childcare, workforce, income, expenses, etc.; and (iii) household characteristics, such as possession of goods, and perception of the breadwinner about living conditions in the household. After the first (1997) and second (2003) waves, the survey collects data yearly since 2008.

source of educational information, but information about family and household conditions is only retrospective, sometimes with a low response rate. The recent paper by (García et al., 2015) constitutes a valuable contribution to the research area with the construction of a longitudinal database unique in the country and the region. With the integration of different administrative data sets, linking information for parents and children, and including SABER data sets, it makes it possible to address more detailed questions involving individuals' educational trajectories.

Since the focus of this study is not on social mobility per se – which is a concept that does not apply to individuals but to societies – this section does not intend to review these studies as part of the state of the art. However, it is worth mentioning that recent literature on this area has approached the phenomenon from the inequality of opportunities perspective within the economic discipline (Ferreira & Meléndez, 2012; Gamboa, 2012; Núñez, Ramírez, & Taboada, 2006; Ruiz, 2011). One of the advantages of this perspective, in contrast to the abovementioned studies, is that it extends the bivariate analysis, that is, the overall association between origin and destination without mediating factors (O-D) (Torche, 2014). As noted previously, national mobility research is largely bivariate. Although some progress has been made towards a better understanding of the intergenerational transmission of advantage, the study of IEO is still a relatively new agenda in Colombia, where mobility studies have ignored the question about the underlying mechanisms. In this regard, Viáfara (2008) argues that despite their importance in understanding the dynamics of social stratification in Colombia, bivariate studies do not allow disentangling the process itself, which implies due consideration of the relative importance of both social origin and individual's characteristics for the final dependent variable. Therefore, and following Torche's (2014) criticism, national research needs to expand with the purpose of understanding the role of different dimensions of mediating factors – such as occupational trajectories, and educational attainment and achievement – as well as other measures of social origin – including race/ethnicity, wealth, family structure, rural/urban area, among others.

The review here is concentrated on those studies which tackle the O-E-D relationship, where education is a mediating variable. The study by Vélez (1990) is one of the first works that applies the status attainment approach in the country. With a sample of more than 4,000 workers in Bogota, the study proposes an extension of the Blau and Duncan's model by adding income as a dependent variable. The findings suggest that the father's education and occupational status significantly determine the individual's educational attainment. Although it seems

there is a high upward occupational mobility through the strong mediation of education, income is determined by worker's educational level and occupational status, which in turn are highly associated with the parent's characteristics. An update on this study (Psacharopoulos & Vélez, 1993) additionally examined the effects of educational quality issues – at primary, secondary, and higher education levels – on individual outcomes in the labor market. Results show that factors such as school location, school gender composition (male, female or mixed), school day, university's prestige, among others, all have a significant impact on earnings and occupational status.

Another way to go beyond a bivariate focus has been addressed by a recent group of studies which represent an important contribution to the research area. In a work for the city of Cali, Viáfara (2006) concluded that educational and occupational outcomes are mainly determined by gender and race, the group with the least educational opportunities consisting primarily of black, poor women. The existence of *cumulative disadvantages* for Afro-descendants were highlighted in further extended studies for the cities of Bogotá and Cartagena (Viáfara & Urrea, 2006), and other 13 metropolitan areas in the country (Viáfara, Estacio, & González, 2010).

6.3 National Studies on Stratification in Higher Education

As in other countries, higher education in Colombia has been required to account for issues, such as effectiveness, quality, outcomes, and resources, among others. For that reason, interest on gathering and monitoring data on performance of higher education institutions has been a growing concern among different stakeholders (e.g., administrators, policy designers, governmental actors and researchers) (Wolter, 2009). As a result, the country has developed a set of four information systems on higher education[125], along with the introduction of the national standardized test for higher education programs, SABER PRO. Over the past decade, thanks to the collection of abundant, relevant data through these systems, higher education research has started to nurture the empirical research paradigm, which until then had been almost exclusively focused on primary and secondary education.

Beyond the frequently studied topic of access to higher education, empirical research questions about stratification at this level of education in Colombia have

125 Described in Annex D.

been mostly concentrated on a set of topics that include: returns to higher education and the value-added of higher education to students' outcomes. To a lesser extent, other themes of interest are: dropout, transition from secondary to higher education, impact evaluations of financial-aid programs, and effects of higher education expansion on inequality. The aspect of institutional diversity in higher education has also been a central factor addressed by some of the studies.

Returns to Higher Education

This research topic has been widely analyzed by economists in education and it is perhaps the aspect that has received most attention in the empirical research on higher education. Concerns for the wage determination have occupied a special place within the educational research agenda mainly because it is driven by policy considerations. The question is not only whether higher education is a profitable investment, but also to what extent differences in wages/earnings are explained by individual attributes beyond educational attainment. Although this work is not primarily concerned with the E-D association, a quick overview of these studies is provided mainly concerning findings on income, as this is the final dependent variable in the current study.

Based on administrative data, these works usually calculate the average monetary returns of one additional year of schooling, or the 'earnings premium' associated with level of education. An in-depth description of these studies falls outside the scope of this section though. The most representative studies in the country – listed in García-Suaza, Guataquí, Guerra, and Maldonado (2011) – agree in indicating a pattern of growing returns as the level of education increases. The authors elaborate a systematic methodological approach, beyond the traditional Mincer equation, and arrive at more accurate estimates, which are lower as the ones suggested by previous studies, yet positive for all program levels including T&T degrees.

Interestingly, there are also studies addressing the effect of institutional diversity. For example, Hernández (2011) found differential returns to higher education according to field of study, program level, and institution. A gender gap in favor of men was found, as well as higher returns for graduates from public universities, which might be associated with the heterogeneous quality of the programs offered by private institutions. However, not controlling for student performance nor social background is a great limitation of many of these studies. Opposite findings are reported in a comparative study with Chile (González-Velosa, Rucci, Sarzosa, & Urzúa, 2015) that shows a significant proportion of

graduates facing negative economic returns. This means that, for many of them, their net earnings might have been higher if they had not earned a university degree. Indeed, a significant variation in returns is found, not only across fields of studies but across institutions and program levels. The authors hypothesize that this could be associated with the heterogeneous quality of institutional arrangements.

Higher Education Value-Added

National studies on student achievement have mostly focused on the levels of primary and secondary education. Nonetheless, the number of studies in higher education on learning outcomes has progressively increased with the establishment of SABER PRO as a mandatory test for graduation since 2009. Given that all high school and higher education leavers take standardized national examinations, Colombia's assessment system is remarkable and unique, thus allowing researchers to take advantage of the value-added approach (Gamboa, Casas, & Piñeros, 2003). Nowadays, Colombia has established its role as a pioneer country assessing the value-added of higher education to students' outcomes (OECD, 2016a), as measures on student achievement in higher education are rare, indeed, in the international literature.

Within the national FAL studies, there is an increasing interest – also promoted by the ICFES – in developing value-added studies. This kind of studies allow us to make comparisons between educational institutions beyond the 'raw league tables' based just on average SABER tests' scores.[126] Apart from analyzing student performance, added-value measurements in Colombian higher education have been mostly applied on economic returns. This approach gives information on the effect size of attending different higher education programs and institutions, not only on student achievement, but also on the degree attainment rates and income.

Apart from income, another individual's labor market outcome frequently studied is the employability. Results obtained by Saavedra (2009) suggest that

126 Indeed, the ISCE index for primary and secondary schools, created recently by the MEN, is based on value added measures that control for pre-existing differences between students. This is especially important in yearly comparisons, as the performance improvement of a certain school at some point in time in comparison to the previous year might be due to the admission of high-performing pupils at one specific cohort and not to school effectiveness itself (Goldstein, 1997).

low socioeconomic background students with an outstanding performance in entry exams benefit the most from attending selective universities, presumably through institutional resources and peer effects: they not only achieve exit test scores comparable to their counterparts from high socioeconomic level, but also have higher probability of being employed one year after graduation, relative to applicants with lower scores in entry exams. In a similar study, Barrera and Bayona (2015) show how individuals who attend elite universities have higher graduation rates and earnings, but no differences in learning gains were found. Some methodological limitations of these studies are identified by Melguizo, Zamarro, Velasco, and Sánchez (2015), who also illustrate how specific combinations of higher education institution and program might have different effects on outcomes, depending on the educational and labor measures considered. In light of rising concerns regarding higher education quality with the rapid growth in the number of programs, a recent paper (Camacho, Messina, & Uribe, 2016) assessed the heterogeneity of the value added by new programs. Findings indicate that both academic achievement and wages of graduates from programs created in the 2000s are substantially lower than those obtained by individuals attending existing, well-established programs. The authors point out, however, that this variance is mainly explained by student sorting in the process of university admission: low-performing students are most likely to enter newly created programs, which in turn tend to be concentrated on fields of study with lower returns.

This emerging line of research has undoubtedly contributed to the understanding of the phenomenon of horizontal inequalities in Colombian higher education – through heterogeneity of programs and institutions – on the basis of robust empirical evidence. Nevertheless, some challenges in applying value added models in Colombian higher education have been identified by Shavelson et al. (2016), particularly with regard to making causal statements.

Dropout in Higher Education

Only until the setting up of the SPADIES database a few years ago, national studies on the phenomenon of dropout in higher education started to develop on the basis of reliable, valid data. Before that, measurements and definitions of this indicator were unclear. The most comprehensive study on the associated factors with dropout in higher education (Sánchez & Márquez, 2012) found that, gross enrollment rate has increased over the past years at the same time as the dropout rate, and that this trend is mainly explained by the socioeconomic conditions of new student cohorts as well as their academic vulnerability. The percentage of

students from low income families (below 3 monthly minimum-wage salaries) jumped from about 52% in 2000 to more than 60% in 2009. In average, the new cohorts have mothers with lower educational attainment and lower scores in SABER 11. Furthermore, the authors found that the growth of enrollment share in T&T programs, in comparison to university programs, has also contributed to maintaining high dropout rates. Students' retention is lower in the former programs, as well, as in the non-university HEIs, including the 'university institutions'. The authors interpret this finding as explained by the better quality resources of universities (e.g., libraries, professors with permanent contract, etc.) in comparison to the other types of institutions.

The abundant relevant information gathered by this consolidated database is certainly one of the most valuable tools at hand today for researchers interested in empirically approaching the many facets of stratification at this level of education. Unfortunately, at the time when the empirical exercise for this study was conducted, this tool has not yet been fully developed or at least made available for external researchers.

Transition from Secondary School to Higher Education

National research on educational transitions with an empirical basis is scarce. Again, the availability and systematization of recent sources of information – such as SPADIES combined with other administrative data – will encourage a significant progress in the study of educational transitions in the future, beyond aggregated figures on access in different levels of education. Based on these data, the descriptive study by Sánchez, Munari, Velasco, Ayala, and Pulido (2016) constitutes so far the most comprehensive work on the transition from secondary school to higher education. Authors found that in average 18% of Grade 9 students enroll in a higher education program. This rate varies widely by country's department though: only 7% in Amazonas as against 23% in Santander and Casanare. A similar pattern of inequality is observed according to socioeconomic strata: almost half of those students who do not enter higher education belong to the two lowest strata, but only 12.5% are from strata 3 or higher. Students from rural areas and over aged individuals at secondary school are also less likely to attend higher levels of education. Among the school factors that are associated with access of pupils to a post-secondary program are: full school-day and a greater proportion of teachers with postgraduate qualifications and working with a permanent contract. Regarding provision factors associated with access, the availability of higher education supply near the individuals' residency increases

the probability for them not only to enter higher education but also to remain enrolled in it. Authors argue that this presumably has to do with the educational aspirations of students and their families within the municipality where they live, which could be influenced by the proximity of higher education institutions.

Impact Evaluation of Higher Education Equity-Policies

The limited enrollment of students from economically disadvantaged households is associated with two major obstacles that often constrain the students' options: low scores in SABER 11 tests, which are typically the basis of admission in selective universities, and/or high costs of tuition fees of private provision.

Since 2002, the government seeks to stimulate expansion throughout a series of policy initiatives centered on access and equity. Most of these initiatives follow the World Bank's policy recommendations for the country (Uribe, 2013), mainly based on a scheme of student's financial aid through the administration of the Colombian Institute for Educational Loans and Studies Abroad (*Instituto Colombiano de Crédito Educativo y Estudios Técnicos en el Exterior*: ICETEX). One of those initiatives is the Access to Higher Education with Quality program (*Acceso con Calidad a la Educación Superior*: ACCES) launched in 2002, which consists of a subsidized student loan for students from the lowest socioeconomic strata. Between 2003 and 2008 more than 129,000 students have benefited from this program. Evaluations have found a positive, significant impact on dropout reduction and higher salaries in the labor market after graduation among loan beneficiaries (Melguizo et al., 2011; Melguizo, Sanchez, & Velasco, 2016; Sánchez & Velasco, 2014).

Nevertheless, opponents of this kind of policy have warned against a new pattern of stratification instead: since the majority of impoverished students are not able to get a spot in the highly selective, low-fee public universities,[127] they take out loans in order to finance their higher education. As a consequence, 80% of these students are enrolled in private, non-selective HEIs and in those programs which are perceived as with high return – which in turn become saturated in the labor market (Gómez, 2015). In light of this limitation, ICETEX has started to target loans for accredited programs and HEIs by progressively "increasing the weight of this variable in the credit-allocation formula" (World Bank, 2017a, p. 14).

127 For instance, 10,802 students were admitted in first-degree programs at the National University out of 100,648 applicants in 2007, equivalent to 11%, a percentage that has remained the same since 2003. (Gómez & Celis, 2009).

Currently, Colombia has probably the highest share of students benefiting from a loan as a percentage of the total enrolled population in Latin America (OECD/World Bank, 2012). This situation raises questions whether or not the state should subsidize higher education demand instead of supply: "the provision of student loans by ICETEX continues to be the main demand-side financing tool to increase access to tertiary education for disadvantaged populations" (World Bank, 2017a, p. 13). A common general critique points out that transferring the financing of education to the individuals results in a privatization process in two ways: scarcity of public supply and family private debt (Gómez & Celis, 2009).

Under the ambitious goal of becoming the region's most educated nation by 2025, the MEN launched another program between 2014 and 2018. *Ser Pilo Paga* program (roughly translated as "being bright or hardworking pays off") was a financial-aid program that annually benefited 10,000 upper secondary education students from the low-income households who have scored at or above the 90th percentile in the SABER 11 test, and have been admitted to one of the accredited higher education institutions, either private or public. If the student accomplishes to finish an undergraduate program in the expected time and with high grades, the total of the loan (which includes tuition and living expenses) is forgiven; otherwise, the student has to assume the full costs. The short-run impact evaluation of this program (DNP, CEDE, & CNC, 2016; Londoño-Vélez, Rodríguez, & Sánchez, 2017) shows that it has doubled the probability for the target population to get access to HEIs with high-quality accreditation. It has also impacted the likelihood for them to choose university programs instead of T&T studies, as well as private institutions over public ones.

Álvarez-Rivadulla (2017) sustains that the program is 'revolutionary' for two main reasons. First, its capacity of opening opportunities of quality higher education for the economically disadvantaged – although it fails when considering other dimensions of social inequality, such as race. Since its implementation, among the pool of high-performing high school students, those from the lowest socioeconomic stratum (stratum 1) have entered accredited HEIs in the same or similar proportion as those from high socioeconomic strata (strata 4–6). As a result, the enrollment rate among the former group increased from 16% to 49%. Second, the program is breaking the *educational apartheid* (García & Quiroz, 2011) by favoring the interaction of dissimilar social classes in conditions of relative equity (Álvarez-Rivadulla, 2019).

Despite the positive results in equity of access, the program has been lively debated among scholars, policy makers, politicians, and the public opinion in

general. An argument against it states that resources go indirectly to private universities, as the majority of students prefer them: 85% of beneficiaries were enrolled in private HEIs. In the long term, it is argued, public education might become deficient, poorer, and inefficient. By contrast, advocates of the program maintain that the main purpose of the program relies on promoting access for the poorest segments of the population, but not to strengthen public higher education – whose structural shortcomings cannot be solved through the program (Londoño-Vélez & Rodríguez, 2017). As an alternative, some opponents have suggested demanding the loan recipients to choose only among public HEIs. However, this distinction would make the socioeconomic gaps even larger. Moreover, as discussed by Wasserman (2017), even if the public university is the most powerful tool of the state to offer equal opportunities, not taking advantage of the already existing vast supply of private higher education would be senseless. Beyond the private vs. public dilemma, it is essential to seek ways of incentivizing the accredited public programs as a valuable option to choose among students and their families, as well as among employers and the public opinion in general. By doing so, the focus should be then on intensifying quality demands for all institutions and programs. In short, it seems that more impact evaluations are in need in order to generate evidence-based policy decisions and make the corresponding changes for improvement.[128]

Studies on Educational Expansion and Stratification

Studies addressing the effects of educational expansion on social mobility – which imply the analysis of macro-structural changes over a period of time – are scarce in Latin America and certainly absent in Colombia. As seen in the previous section, authors have found rising patterns in the levels of absolute mobility of credentials, as a result of the growth in enrollment at all educational stages. In that sense, it became common that adult children attain more education than their parents. However, relative mobility (i.e., the extent to which an individual's relative position in the distribution of educational attainment is independent of his

128 As for September 2018, *Ser Pilo Paga* has been suspended by the incoming government and replaced by a new program called *Generación E* (translated "E Generation"), which is based on a similar scheme but intended to benefit more students from vulnerable backgrounds (rising from 40,000 to 320,000 in 4 years). The program aims at optimizing resources, including greater participation of public institutions, a special focus on peripheral regions, and demanding the private universities to take over 25% of the financial burden.

or her parents') remains uncommon. In other terms, those with least educated parents are significantly more likely to become the least educated in their own generations. Indeed, this pattern of high absolute mobility but low relative mobility in education is unique to Latin America (World Bank, 2017b).

Regarding the association between macro-level factors and social mobility, there is only a small number of studies in Latin America given serious data limitations. Regarding the effect of educational expansion on IEO in Colombia, a comparative study with Brazil, Chile, and Mexico (Torche, 2010), by means of a cohort analysis, examines changes in socioeconomic disparities in educational attainment. Results suggest an equalization in early educational transitions across countries which appears to be driven by expansion: "as the educational system expands beyond population growth, it becomes more inclusive" (Torche, 2010, p. 104). Nevertheless, a different picture emerges with regard to the transition from completion of high school and access to higher education: low enrollment in higher education is most likely because at that point the lower classes have lost the capacity to keep their children enrolled in the education system. Instead, they send them to the labor market in the face of economic crisis, rather than as a reaction to a scarcity of higher education supply. In light of this interpretation, financial-aid programs benefiting low-income students to enter higher education, as the one discussed in earlier pages, might have substantive impact on equalization of opportunities in this particular population. Further strategies regarding other social groups, such as high-performing students from middle-income sectors as well as poor low achievers, also need to be considered.

6.4 The Present Study

The literature review of this chapter was not a goal in itself, but an intermediate step in identifying the gaps in the national research context around the topic of IEO and the contributions of the present study in that direction.

6.4.1 Addressing some Research Gaps

The literature review has revealed that systematic, empirical studies on IEO have been predominantly carried out in developed countries with similar levels of social inequality. With few exceptions, non-industrialized countries rarely appear in empirically-based studies on educational stratification, largely due to the lack of longitudinal data. Thus, this research area still has to overcome the challenge of examining in detail the magnitude as well as the causes and consequences of

the unequal distribution of educational opportunities in societies with high levels of economic inequality, as is the case of Latin American nations. Even though the extremely high degree of social inequality in the region has been well documented in a vast number of studies, these countries have rarely appeared in cross-national or empirically-based case studies on the topic, largely due to the lack of longitudinal data (Buchmann & Hannum, 2001). In the midst of increasing levels of inequality both between and within societies (Piketty, 2014), the unequal distribution of educational opportunities in low- and middle-income nations is an urgent matter of research.

The present study analyzes the phenomenon of IEO by providing recent empirical data about Colombia. The country is an interesting case worthy to study, where extreme social inequality indicators coexist with an accelerated expansion of higher education, albeit by way of a hierarchical institutional differentiation. Accordingly, a relevant matter of research is whether the Colombian education system plays a positive role in the reduction of inequalities among those who have successfully completed their trajectories across the system and have been awarded a university degree. This study goes a step further in the traditional discussion and advances conclusions on the particular mechanisms in a local setting on the basis of empirical evidence with administrative data.

This study extends prior research in the country in several ways, by providing: (i) a comprehensive approach to the topic of IEO by combining the theoretical discussion with empirical evidence; (ii) an integration of several research traditions; (iii) a special focus on the mechanisms that link social origin and individual's educational and occupational outcomes; (iv) an analysis of the individuals' trajectories across different points in time; (v) an emphasis on educational stratification at the level of higher education; and (vi) an examination of horizontal inequalities manifested in the stratified institutional paths among university degree holders.

6.4.2 Refining the Research Questions

Finally, this section examines the research questions of this study in light of the theoretical approaches discussed before. The theoretical review undertaken in this chapter provides a solid basis to tackle the research questions around the topic of IEO. Taken together, the assumptions derived from the theoretical underpinnings provide insights into the trends and mechanisms underlying the phenomenon of IEO. It is important to note, however, that the purpose of the present study is not to test statistically – in the strict sense of the term – the different

hypotheses drawn from these theoretical approaches. To undertake such a task would imply methodological challenges, beyond the limitations effective here. For one compelling reason, the pertinent theoretical approaches have different levels of specification. For example, while some of them are 'hard' general social theories, other are 'middle-range' theories, defined as those focused on delimited aspects of empirical phenomena, based on observed data, and not intended to deduce universal propositions (Merton, 1968). As examples of the first group one may consider the human capital and reproduction theories, while the second group would comprise the RRA, MMI, and EMI hypotheses. Some of these theoretical approaches will be used as potential explanations of the findings obtained in the empirical exercise presented in Chapter 8.

Considering the research questions in the framework of the O-E-D triangle, each one points to a specific association in the triangle (see Table 9). While the first three questions address the issue of the mechanisms at the individual level, the last question leads to a more general discussion – although a macro-structural level of analysis is not envisaged in this study.

The *first* question deals with the O-E association, particularly whether and how social origin matters for the individuals' access to different types and quality of secondary school and higher education institution. For that purpose, a set of relevant characteristics will be analyzed according to what was found in the literature review within the national research on factors associated with learning (briefly summarized in Chapter 6), as well as to the particular institutional arrangements of the national education system (described in Chapter 5).

The *second* question also deals with the O-E association, regarding differences in academic achievement among individuals with different social origin attending different types of secondary schools and higher education institutions. Achievement will be measured by means of the national standardized tests at both levels of education.

The *third* set of questions examine the overall O-E-D association, considering the effect of social origin on individual's earnings after graduation. A particular focus is on the mediating role of education, that is, whether the institution attended and the subsequent student performance might mitigate the association between social background and income in the labor market.

Table 9: Relationship between the research questions, levels of analysis, and theoretical approaches

Research question	**Level of analysis**	**Theoretical approaches**
(1) To what extent and through which mechanisms does social origin determine the type of institution attended in both upper secondary and higher education levels?	Individual: O-E Choice of institution	-Human capital -Rational Choice (RRA) -Reproduction
(2) To what extent and through which mechanisms does social origin determine the individual academic achievement during both upper secondary education and a bachelor's degree program?	Individual: O-E Academic achievement	-EER -Reproduction
(3) To what extent and through which mechanisms does social origin determine the graduates' income? How does achievement and type of institution mediate the relationship between these factors?	Individual: O-E-D Income	-Industrialism -Reproduction -MMI -EMI
(4) Does the Colombian higher education system contribute to equalizing opportunities among individuals or does it reinforce the inequalities associated with social origin?	Macro-structural: O-E-D	Equalization vs. Persistence

Source: Own elaboration.

Lastly, the *fourth* question leads to a general discussion based on the findings obtained at the individual level. However, since the approach of this study is not comparative, this last question is not oriented towards changes across cohorts due to the expansion of the national education system nor towards other macro-structural changes. The discussion of results will be guided by the politically relevant dichotomy between equalization and persistence of inequalities.

7 New Evidence on Old Questions

Here, three sections are used to describe the sources of information and data, the construction of variables, and the methodological design. The first section offers a description of the sources, the integration of databases, the composition of a data set, the target population, and the sample. The second section deals with the model for the study and the statistical techniques employed. The third section presents in detail the operationalization and construction of the variables included in the model.

7.1 Data

Several limitations were found when gathering data for conducting this study. In spite of the development of large national information systems at the different education levels, these still face a number of limitations in access and quality, related to weak capacity of collection, use, and integration. As the different systems are administered by diverse governmental organizations on education matters (e.g., ICETEX, ICFES, and MEN) which operate independently of each other, "access and use are often difficult and there are few tools to enable users to link data systems" (OECD, 2016a, p. 57). Other important sources of information on education indicators were also considered for this study, but results were not encouraging. On the one hand, either the required information was not provided for external independent researchers or the databases did not include the variables for this study (e.g., information on social origin). And wherever valuable information was, indeed, available, it was attempted to validate it by other sources, which was not feasible due either to technical or confidentiality reasons. On the other hand, databases work with different indicators, methods and under diverse purposes, thus making it difficult to ensure consistency under common standards. Another limitation has to do with the existing significant delay between the time when data were collected and when they are available for analysis. In spite of this, the ICFES have progressively made important advances in delivering recent data faster. The data used for this study were certainly the most recent by the time they were gathered in 2013.

In view of these limitations, the research design was firstly adjusted to collect primary information by way of an online survey among university graduates. Thus, the survey was designed to follow the model of retrospective surveys in

the tradition of intergenerational mobility, which typically includes questions on the socioeconomic background of the individual's household and family conditions when the respondent was 15 years old. To the best of my knowledge, surveys of this kind have not been administered at a large scale in the national or local contexts with the particular purpose of studying intergenerational social mobility from a sociological framework. During a one-week implementation of the instrument, there was a successful participation with n=1,035 respondents (after excluding missing data and applying filters).[129] In the meantime, this project was selected for financial support by the ICFES Call for Papers 2013, which made it possible to get access to the databases administered by this institution as well as to individual identifiers matching the data with those included in the Labor Observatory for Education (OLE) database from the Ministry of Education (see Annex E). The present book then is partly the result of the project funded by the ICFES and carried out during 2014.

A comprehensive data set was uniquely constructed for this study through the integration of three different administrative databases (see Table 10): SABER 11 and SABER PRO from the ICFES, and the OLE database from the MEN. The first two databases include information collected through the administration of two national standardized tests at different educational levels: SABER 11 and SABER PRO tests. Both data sets include information regarding students' socioeconomic, demographic, and academic issues. The third database contains information on the labor conditions of higher education graduates.

Table 10: Databases used in this study

Database	Institution	Target population
SABER 11*	ICFES	Upper secondary students in Grade 11.
SABER PRO*	ICFES	Higher education students in the last semesters of their first-degree programs.
OLE**	MEN	Graduates from higher education programs.

Source: Own elaboration.
Notes: For a description of the databases, see: *Annex A and **Annex E.

SABER 11 is a compulsory high school-exit exam that assesses the competencies developed by students in the last year of school: Grade 11. Nowadays, it is a useful tool for educational evaluation, but also for vocational orientation as well

129 The richness of the information gathered through the items of the instrument used in the online survey during the first stages of this study was replaced by more simplified – yet systematic – information from the ICFES databases, thus obtaining a larger number of observations.

as for selection and admission processes in some higher education institutions. SABER PRO is a compulsory university-exit exam, which is a graduation requirement for all existing first-degree programs, and it is applied twice every year, corresponding to two different higher education graduation cohorts. It assesses the competencies acquired by undergraduate students from last semesters of bachelor's degrees.

As part of the information systems of higher education, OLE collects, monitors, and analyzes yearly information of all higher education graduates since 2001, on employment status, economic sector, and earnings. The OLE database combines information from the SNIES, which integrates the information provided regularly by all higher education institutions, and additional information from external sources on labor conditions of graduates. This national graduate tracking is a unique and very successful model in Latin America, as most of the countries in the region do not collect data on these issues on a systematic basis (Thorn & Soo, 2006), although some initiatives recently have been developing (e.g., *Mifuturo* website in Chile).

7.1.1 Integration of Databases

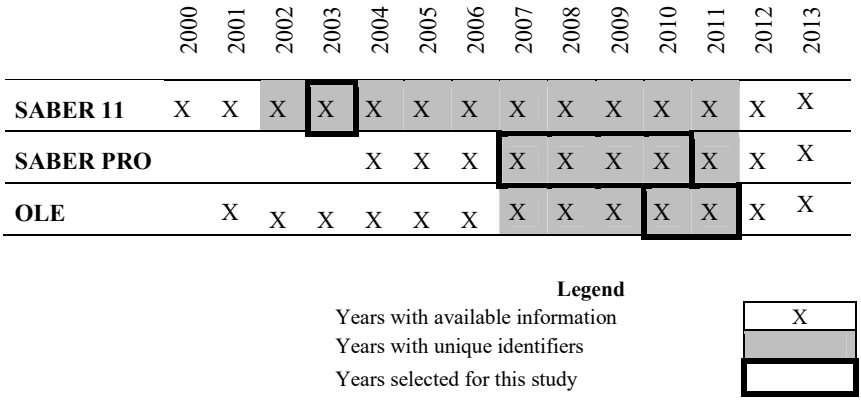
In the framework of a cooperation between both state institutions, the ICFES and MEN have created a unique (anonymous) identifier for every individual student, which allows tracking each person in the OLE data and the ICFES databases. Although those identifiers made it possible to reconstruct individuals' paths, the integration of the corresponding databases meant certainly a challenge for a number of technical reasons.

The final data set obtained includes detailed information of different kinds (i.e., socioeconomic, demographic, and academic) related to the same individual at three points in time across the life course: from the time they took SABER 11 in secondary school, subsequently when they took SABER PRO during their undergraduate studies, until they appear in the OLE data as graduated workers in the national labor market. Additionally, the databases include institutional information about both the secondary school and the higher education institution that students have attended. Using this information, it was possible to reconstruct the educational and occupational trajectories of university graduates.

The following set of years were selected for this study (see Figure 9): SABER 11(2003), SABER PRO (2007–2010), and OLE (2010–2011). Regarding SABER 11 database, the period between 2004 and 2007 was not considered because during these years there is no information available on the individuals' social

origin, which is a key variable for this study. Additionally, cohorts after 2007 were also excluded because they show only few cases matching with SABER PRO. This is to be expected as the time period between both tests is at least 4 years, which is the minimum duration required for an undergraduate program (ISCED 6). SABER 11 (2002) was not considered mainly because a group of students would not be included in the final sample, namely, those students who took SABER 11 in 2002 and immediately went to university, thus completing an undergraduate program after 4 years. In this case, these students are unlikely to be observed in SABER PRO (2007), due to the fact that most probably they have taken the university test before 2007. Typically, university students present the SABER PRO when they have already passed at least 75% of the program's total credits or are close to graduation (ICFES, 2013a).

Figure 9: Selected years for this study



Source: Own elaboration based on ICFES (2013a).

In short, this data set includes information for a cohort of upper secondary students, that is, those who took the SABER 11 test in 2003. Among this population of students, those who entered higher education did so from 2004 onwards. Thus, they are likely to be found in the SABER PRO database at least three or four years after starting the bachelor's program. For that reason, the SABER PRO (2007–2010) has been selected.

Regarding OLE, the data set for this study includes years 2010 and 2011. These years are the most recent that include the identifiers to merge with the ICFES databases. Every year, OLE tracks not only the HE graduates who got their degree in that year, but also all graduates of last years since 2001. This allows us

to track those individuals who graduated between 2007 and 2011, and identify their participation in the labor market between 2010 and 2011. Given that most students get a job within two years after graduation, this relatively short period is appropriate to observe the early labor outcomes of interest in this study.

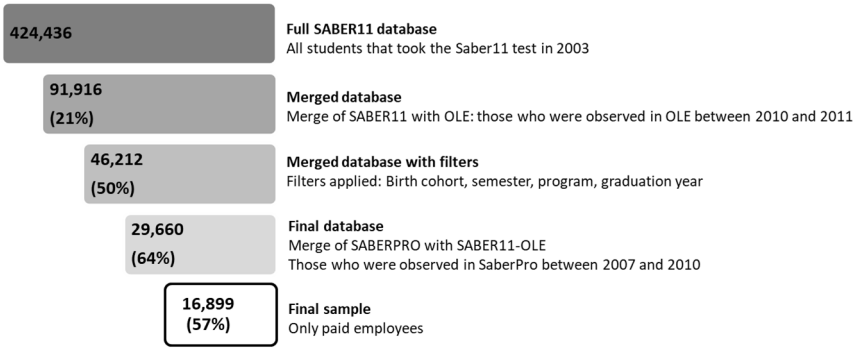
SABER 11 (2003) originally consists of 424,436 observations in total, out of which 91,916 matched with OLE (2010–2011). This number indicates that 21% of the upper secondary students, who took the SABER 11 test in 2003, finished a bachelor's program in the following years until 2011.

In order to reduce the dispersion in the characteristics of the population, the sample was restricted by applying the following filters:

- **Birth year**: Individuals born between 1983 and 1988. Only those who were in the range of 15–20 years old at the time they took the SABER 11 exam were considered, leaving those over schooling age excluded.
- **SABER PRO semester***:* Since the SABER PRO test has been designed to assess academic learning achieved during higher education studies, the sample consists only of students from advanced semesters in first-degree programs. Those students from 6th semester or below at the time they took the test were excluded.
- **Level of undergraduate program**: Only bachelor's programs (ISCED 6) were considered, thus excluding the technical, technological (ISCED 5) as well as the postgraduate programs (ISCED 7 and 8).
- **Graduation cohort**: The sample includes individuals who got their bachelor's degree between 2007 and 2011. Thus, those cases that showed less than 4 years between SABER 11 test and the completion of a university program were excluded.

The 'merged database' with the filters mentioned above includes 46,212 cases (see Figure 10). Once the SABER PRO (2007–2010) was merged, the data were cleaned and missing values were excluded. The 'final database' contains a total of 29,660 cases, which corresponds to 64% of the merged database with filters, and which is deemed satisfactory. Moreover, the sample for this study was further restricted to the paid employees. This was done for analytic purposes that will be explained in the next subsection.

Figure 10: Integration of databases and composition of the sample



Source: Own elaboration.
Note: Percentages in brackets indicate the reduction percentage of the database in comparison to the previous one.

7.1.2 Target Population and Sample

As the target population of the present study comprises graduates from bachelor's programs, it is important to understand the transition from upper secondary education into higher education. As already described thoroughly in Chapter 5, when Colombian students complete upper secondary education (ISCED 3) in any of the existing tracks (i.e., academic or vocational), they have three main options: to transit directly into the labor market, to attend courses of training for work (ISCED 4), or to pursue higher education. In the last case, they can choose among the four different types of HEIs and programs at ISCED levels 5 or 6. These institutions are completely autonomous in establishing the admission requirements for a given education program (e.g., the minimum score in the SABER 11 test, other specific exams, interviews, school grades, etc.). The present research is particularly focused on graduates from bachelor's programs (ISCED level 6) who had completed their studies either at university institutions or universities.

Specifically, the target population for this study consists of all university graduates born between 1983 and 1988, and who received their bachelor's degree between 2007 and 2011. The frame population then is composed of those graduates with these characteristics who are registered in the OLE database, and whose scores in both standardized tests (i.e., SABER 11 and SABER PRO) are available in the ICFES databases for the years selected. As there is no a single database that fulfills all these conditions, it was not possible to select a proper *probability*

sample[130] for this population. Furthermore, it should be noted that whereas SABER 11 is a census – at least among those who actually enter higher education – SABER PRO is not for the selected years in this study, as it did not became compulsory until 2009. For this reason, there is a certain portion part of the sample that is not at random, thus leaving some groups of graduates out of the sample.

These groups could be broadly classified into two: (a) those who took both exams but have not been identified for the databases' matching due to technical reasons; (b) those who have participated in SABER 11 but not in SABER PRO. The first case does not appear to be problematic, as there is little reason to think that the technical procedure of merging the databases is associated with the social origin characteristics of individuals or with other relevant variables.

As for the second case, in order to avoid sampling bias, the strategy adopted here consisted of comparing the final database (before excluding independent workers and unemployed) to the merged database between SABER 11 (2003) and OLE (2010–2011) with filters. This comparison allowed identifying to what extent the sample represents the population of the original database, that is, whether the population of university graduates included in the merged database is substantially different with respect to those included in the resulting base after merging SABER PRO (2007–2010). To this aim, the non-selected cases in the sample were compared with the selected ones, considering sex and social origin,[131] two key independent variables of this study. Based on a binary logistic regression, the probability of a case to be chosen in the sample is calculated, based on the named independent variables (see Table 11).

The odds ratio in Table 11 indicates the increase of the odds of being selected. Sex has a moderate effect: women have 12% more chances to be selected in the sample. The differences between being and not-being selected by the social origin's effect are highly significant but relatively small. Those cases with higher cultural capital have better chances of being in the sample, whereas those cases with higher economic resources have less chances.

130 A sample is referred to as probability (or representative) sample when every element in the frame population has a known and nonzero chance to be selected in the sample (Groves, 2004). There are two types of probability samples: random and stratified.

131 Social origin factor is built on the basis of two scores: economic resources (measured by parental occupation, family income, and home ownership) and cultural resources (measured by parental education). The process of construction of this factor is explained in detail further in this chapter.

Table 11: Logistic regression: odds ratio of being selected according to sex and social origin

Independent Variable	Odds Ratio	
Economic resources' score	0.92	***
Cultural resources' score	1.27	***
Female	1.12	***
Constant	1.86	***
LR chi²	748.59	***
Pseudo R²	0.01	
N	44,683	

Source: Own elaboration.
Notes: Dependent variable (dummy): being selected in the sample.
*p ≤ 0.10 ** p≤0.05 ***p≤0.01

Table 12 shows the maximum, minimum, and mean values of the selection factor for both groups: selected and non-selected. As can be seen, they are rather similar. Nevertheless, in order to control this existing yet reduced selection effect, the strategy applied here was to apply the Inverse Mills Ratio (IMR) and the Heckman correction within the regression models in the analysis.[132]

Table 12: Selection factor

	Minimum	Maximum	Mean
Non-selected	0.502	0.775	0.646
Selected	0.496	0.779	0.663

Source: Own elaboration.

Due to analytic purposes, another reduction of the sample was undertaken, by considering the working conditions of graduates. As a result, the final sample for this study was obtained by restricting the final database to the paid employees. This study only addresses those individuals who actually work in the formal labor market and contribute with payroll taxes (73% of the cases). Consequently, the unemployed and those working in the informal sector are not considered. Moreover, the group of independent or freelance workers (23% out of the total of taxpayers) had to be excluded because they are registered in the OLE database as if they would not earn any income. The decision of not including freelance workers in the sample is mainly due to the fact that it is not possible to obtain the

132 This two-step method offers a way of correcting possible selection bias in cases of non-randomly selected samples. It consists of calculating the IMR, also known as the inverse probability of selection, and its inclusion as an additional explanatory variable within the regression analysis (OLS estimation) (Heckman, 1979).

final dependent variable (i.e., income). This has the limitation, however, of not considering the effect of the economic resources on entrepreneurship activities, which might reduce the effect of social origin on the individual's occupational outcomes. Regardless, this study is restricted to income as an occupational outcome, but does not explore the acquisition of wealth by individuals. At last, the final sample is composed by 16,899 graduates from bachelor's programs who are integrated as salaried employees in the national labor market.

A fundamental concern lies in that *unobserved heterogeneity* may turn the statistical exercise into an incorrect representation of the Colombian graduates' outcomes. With the aim of identifying a possible bias due to omitted variable problem, it is important to determine the characteristics of those who were excluded in the final sample. Table 13 displays the distribution of salaried workers in comparison to the freelance workers and those unemployed in five educational variables, namely: field of study of the undergraduate program, sector and type of the HEI, and sector and type of secondary school.

As shown in Figure 10, and displayed in detail in Table 13, 57% of the final database are paid employees. Those excluded from the sample were either unemployed (25%) or independent workers (18%). From the table we observe that the characteristics of educational institutions (i.e., type and sector) do not constitute a relevant factor in terms of 'representativeness'. In other words, individuals belonging to the sample are distributed across these variables similarly as how the population is distributed in the final database. Nevertheless, concerning the field of study, important variations should be noted. There is a greater representation in the sample of graduates from areas such as engineering/architecture/urban planning and economics/management/account, which is consistent with the better chances of employability in these professions. By contrast, fields such as arts and human/social sciences exhibit a much lower representation in the group of employees, which could be explained by a tendency of these professionals to work as freelancers. There is also a lower representation of mathematics and natural sciences graduates, which is consistent with national reports: most of the students from this field decide to continue with their postgraduate studies (MEN, 2012). Finally, it is worth noticing the low percentage of graduates from agronomy and veterinary working as employees, which could be explained by the reduced number of students who graduate in these areas: only 1.4% out of the total of graduates in 2010 belonged to this field of study (OLE, 2015). As a consequence, they may have lower chances of being selected in the merged database, being those non-employees overrepresented in the sample.

Table 13: Distribution of paid-employees, self-employed, and unemployed in secondary and higher education variables

		Non-selected in the sample				Selected in the sample			Final database
		Unemployed*	Freelance	Unemployed and freelance		Paid-employees		Rep.$	
Field of study	Agronomy, veterinary	214	118	332	(61)	208	(39)	–	540
	Arts	346	154	500	(54)	433	(46)	–	933
	Economics, management, account	1,424	679	2,103	(36)	3,789	(64)	+	5,892
	Education	817	327	1,144	(42)	1,559	(58)		2,703
	Engineering, architecture, urban planning	1,751	1,161	2,912	(35)	5,503	(65)	+	8,415
	Health sciences	1,033	1,137	2,170	(49)	2,222	(51)	–	4,392
	Mathematics and natural sciences	277	170	447	(54)	382	(46)	–	829
	Social and human sciences	1,643	1,507	3,150	(53)	2,801	(47)	–	5,951
	Other	2	1	3	(60)	2	(40)	–	5
HEI sector	Public	3,409	2,349	5,869	(46)	6,871	(54)		12,740
	Private	4,096	2,903	7,303	(42)	10,019	(58)		17,322
Type of HEI	University institution	951	611	1,562	(41)	2,269	(60)		3,831
	University	6,554	4,641	11,195	(43)	14,621	(57)		25,816
School sector	Public	3,486	2,387	5,873	(46)	6,949	(54)		12,822
	Private	4,021	2,867	6,888	(41)	9,950	(59)		16,838
Type of school	Academic	4,471	3,133	7,604	(43)	10,252	(57)		17,856
	Vocational	3,036	2,121	5,157	(44)	6,647	(56)		11,804
Total				**12,761**	**(43)**	**16,899**	**(57)**		**29,660**

Source: Own elaboration.

Notes: HEI (higher education institution). Numbers in brackets indicate percentages.

*This column also includes those working in the informal sector.

$This column refers to the extent to which the subgroups in the sample (by educational variables) are 'underrepresented' (–) or 'overrepresented' (+) with respect to the population of the final database.

Even though the empirical analysis for this study does not control the field of study in the model, it is of course a very important explanatory factor of the graduates' income. This limitation will be considered, though, in the discussion of results. All in all, despite the strategy here adopted, the possibility of some unobserved heterogeneity cannot be dismissed altogether. Great improvements in this type of research would be facilitated by access to better qualitatively and quantitatively superior data that would allow measuring directly those factors which usually are unobserved.

7.2 Study Design

This section presents a general model for analyzing IEO through trajectories from upper secondary to higher education, the specific model for this study, as well as the statistical technique of path analysis.

7.2.1 A Model for Analyzing IEO through Trajectories

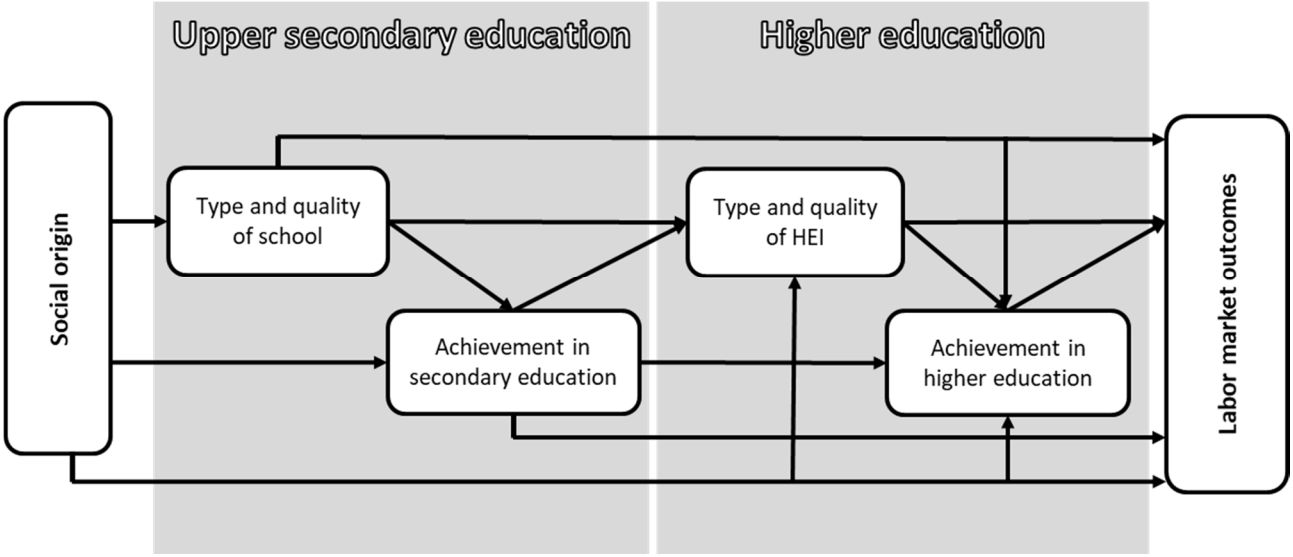
Even though Blau and Duncan's status attainment model constitutes a valuable methodological contribution to the analysis of inequality of opportunities, it is insufficient, however, for examining all research questions of the present study. Two main criticisms addressed to the classic model apply here. On the one hand, it measures respondent's educational outcomes as number of years completed. Thus, a year of schooling is treated as being equivalent irrespective of level under the assumption that the number of years operates in a linear fashion and can be modeled as any other metric variable. However, from the life course perspective, there is abundant evidence of the importance of the transition from a certain educational level into another. Also, outcomes of the educational process in qualitative terms, such as student performance, are not considered by the classic model. Another frequent criticism, on the other hand, is that the status attainment model has underestimated the institutional context effects on the structure of the relations between origin and destination (Bowles & Gintis, 2002; Kerckhoff, 1995). It has been argued to this effect, that individuals with different socioeconomic origins receive different types of education, which at the same time can potentially affect their ultimate outcomes, and finally their chances of social mobility.

This study proposes an important modification of the classic model, aiming at capturing the complexity of educational outcomes, including both qualitative characteristics of institutions and student achievement, at two levels of education.

In Latin America, some previous studies have already addressed this issue. For instance, Puga (2011) has refined the classic model for analyzing the impact of different school types on the future occupational attainment in Chile; and Huerta (2012) has replicated the model in a comparative study between Chile and Mexico by introducing information about early academic performance. In Colombia, the application of these models to the social mobility research still leaves much to be desired. Only a few national studies (Viáfara, 2006; Viáfara et al., 2010; Viáfara & Urrea, 2006) have applied status attainment models for estimating the effect of race and gender on occupational outcomes, including a more detailed description of social origin, but without qualitative information about the individual's educational outcomes, such as achievement.

Figure 11 illustrates a general framework for the analysis of the individuals' outcomes across their educational and labor outcomes, particularly in their transit from upper secondary into higher education. As displayed in Table 2 (Chapter 2), different kinds of individual outcomes can be analyzed in the study of IEO: access, attainment, achievement, choice, and labor outcomes. The model envisaged here considers the role of social origin in the determination of the following three outcomes: the type and quality of educational institution attended in both levels (research question 1); academic achievement in upper secondary and higher education (research question 2); and income as a labor outcome (research question 3).

Figure 11: A framework for the analysis of individual trajectories through upper secondary and higher education



Source: Own illustration based on a similar scheme in Triventi, Kulic, Skopek, and Blossfeld (2016, p. 10).
Note: HEI (higher education institution).

This model allows us to assess and analyze the differences related to both student achievement and choice of institutional type among individuals with the same level of educational attainment. The analysis of IEO is then based on the association between social origin and the three kinds of outcomes across trajectories. The rationale guiding this framework is that social origin may have a subsequent impact on individual outcomes across their educational and labor paths. Such an impact may occur differently according to the particular educational transition and the turning point over the life course. Following the literature reviewed, social origin is likely to impact directly the level of student performance in school (*achievement in secondary education*). The hypothesis here is that students born into families with different cultural and economic resources may receive different types of secondary education (*choice of school type and quality*), and that school factors, in turn, may also affect the student performance at this educational level. The selection of those institutional characteristics regarding type and/or quality to be included in the model depends on the research interest and the availability of data, but also on those forms of differentiation that seem to be the most important in the national context and the educational level under study.

In addition, both the level of academic achievement in secondary education and the school type may have an impact on the subsequent trajectories in higher education, with regard to the institutional differentiation (*choice of HEI type and quality*) and the resulting student performance (*achievement in higher education*). Finally, social origin, academic achievement, and institutional differentiation may together have an effect on the individual's entrance and transit into the world of work (*labor outcomes*).

Estimating a full and comprehensive model for analyzing IEO would imply to include various complex causal relationships. At the cost of simplifying the model, the framework suggested here only consider the above-mentioned intervening factors. One important missing factor is prior student performance, that is, the individual's achievement in previous levels of education (i.e., primary and lower secondary education). This variable is particularly important in those education systems in which previous academic performance – based on test scores, school marks, or teachers' recommendations – is decisive in the allocation of pupils to different tracks (Blossfeld et al., 2016; Jackson, 2013a). This is not the case, however, of the Colombian education system. Moreover, information about prior student achievement is not available in the data set for the present study.

7.2.2 The Model for the Present Study

Table 14 lists the independent, control, and intermediate (intervening) variables, as well as the final dependent variable. Social origin is a composite of socioeconomic and cultural resources of the family. The intervening variables correspond to both student achievement and institutional type in upper secondary and higher education. Income is the final destination variable as an occupational outcome. The control variables to be included are: sex, bachelor's graduation cohort, birth year, and the selection factor (Inverse Mills Ratio). The construction and operationalization of variables is described in detail further in the next section.

Drawn from the general framework proposed previously, the model for this study is displayed in Figure 12. As in the classic status attainment scheme, this model distinguishes two dimensions of social origin: the family's cultural and economic resources. Most importantly, this study considers information of both parents instead of just the father's education.

Table 14: Classification of variables

Independent variables	Dependent and/or intermediate variables	Final dependent variable	Control variables
Social origin: - Family's economic resources - Parental education	- School type - SABER 11 score - HEI type - HEI quality - SABER PRO score	- Income	- IMR - Sex - Birth year - Graduation cohort

Source: Own elaboration.
Notes: IMR (Inverse of Mills Ratio); HEI (Higher education institution).

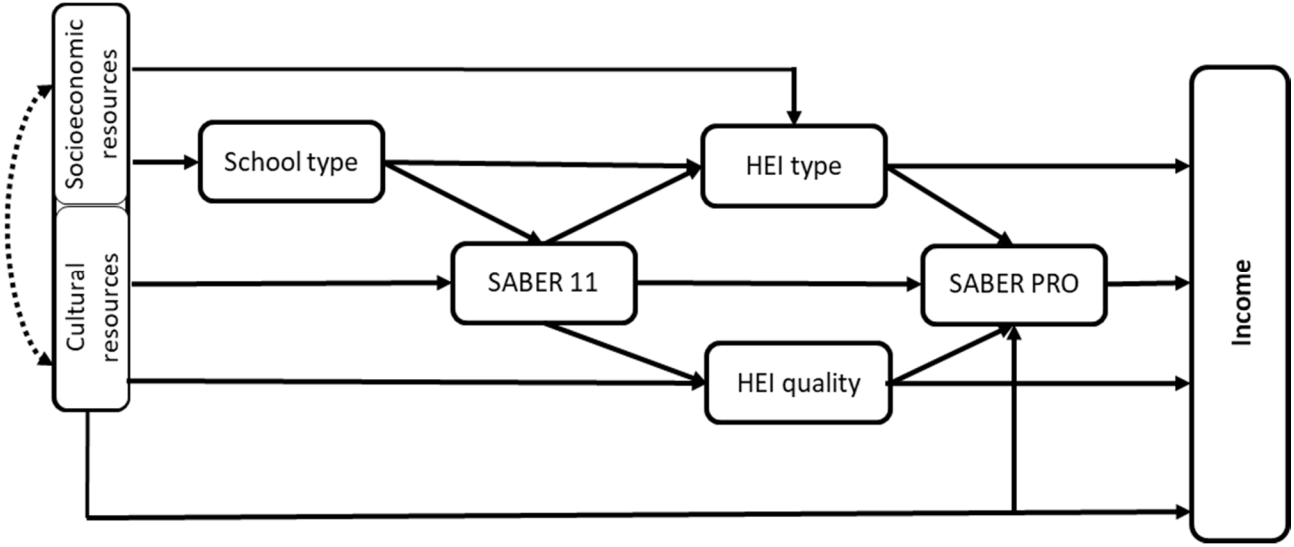
As in the general framework, choice and achievement are the educational outcomes considered. However, strictly speaking, this work does not investigate directly educational decisions. Typically, decisions are examined through transitions, that is, through the assessment of the likelihood of the total population in a certain educational level to either enter different paths at the next level or exit the education system. Since the present data set does not provide information on the total population having successfully completed secondary school and entered different higher education programs, it is not feasible here to observe all the possible trajectories taken by them. Therefore, those secondary school students who did not continue higher education, and were not awarded a bachelor's degree

cannot be tracked. In spite of this limitation, this study builds retrospectively the graduates' pathways on the basis of the individual continuation decisions about the type of institution attended in upper secondary and higher education. An important remark should also be made concerning the educational institution attended as conceived as a 'decision', but it may be the case that it was the only choice at hand or affordable, because of location conditions and/or fees.

With the information available in the data set, some relevant characteristics related to the type of upper secondary school were selected to be included in the model: sector (public/private), curriculum orientation (academic/vocational), school day (full-time/part-time), school year (calendar A/B), and location (rural/urban). Although some of these school characteristics are linked to quality indicators, as discussed in Chapter 6 on the evidence produced by FAL studies in the country, they do not measure quality directly. At the higher education level, the type of institution is given by characteristics of sector (public/private) and fees. As quality indicators of institutions at this level, the model includes the institutional typology (university/university institution), the possession of quality accreditation, and the percentage of academic staff with postgraduate certificates.

Academic achievement in the model is assessed through the students' scores in the national standardized examinations taken across their advanced studies during secondary school (SABER 11) and the bachelor's program (SABER PRO).

Figure 12: Analytical model for this study



Source: Own elaboration.
Notes: For illustrative reasons, all possible arrows from social origin variables are not shown.
The double-headed curved arrow indicates correlation between variables. Single-headed arrows indicate 'paths'.

7.2.3 The Path Analysis Technique

The classical status attainment model is based on the use of *path analysis*. Originally, this technique was developed in the discipline of genetics at the beginning of the 20th century (Wright, 1921). In the decade of the 1960s, it was introduced in the social sciences research, and Blau and Duncan were the first authors who applied it in their studies on social mobility.[133] In general terms, path analysis is an extension of the multiple regression analysis that estimates the magnitude and strength of effects among variables in a hypothetical causal model. Even though this technique does not test causality, it is useful for decomposing the various factors affecting an outcome variable into direct and indirect effects (Lleras, 2005). Indirect effects are those effects that are part of a variable's total effect which are mediated by intervening variables in the model. The direct effect of one variable on another is the part of the total effect which is not transmitted via intervening variables (Alwin & Hauser, 1975). In the present study, the path analysis technique allows us to carry out a 'path analytic' decomposition, by measuring the direct impact of social origin on destination and its impact via education.

Taking the O-E-D triangle as reference, the decomposition of the total effects into different parts would be as follows: the *total effect* of origin on destination is the resulting sum of an *indirect effect* via the individual's education (O-E, E-D), and a *direct effect* from origin to destination without involving education (O-D). Statistically, the relationships between correlation and path coefficients in the O-E-D triangle can be written as:

$$pat\ r\ OD = \beta OD + \beta OE \beta ED$$

As the above makes clear, there are two sources of correlation between O and D: the direct effect of O on D (represented as βOD), and the indirect effect of O operating through E (reflected by the product βOEβED). The sum of direct and indirect effects results in the total effects. This way, it is possible to decompose the correlation between two variables (O and D) into its component parts, that is,

133 Path analysis was earlier used by Duncan and Hodge (1963), for a sample of 1,105 males from the city of Chicago.

by identifying how much of the correlation is due to direct effects, indirect effects, or even to common or correlated causes.[134]

Considering Figure 12, variables of social origin are *exogenous* (independent) variables, educational variables are *endogenous* – which can be either dependent or independent – and income is the final endogenous (dependent) variable. The *residual* or disturbance terms – yet not notated in the figure – reflect the unexplained variance and measurement error. One-way arrows represent the direct effects in the model, also known as *structural effects*. The double-headed arrow indicates *correlation*, which might arise through covariance between parental education and family's economic resources. In the present study, linear regressions with ordinary least squares (OLS) estimates are calculated to predict the path coefficients. Six regression models are run for each one of the dependent variables assessed: school type, SABER 11 scores, HEI type, HEI quality, SABER PRO scores, and income.

Despite its usefulness, this technique has not escaped criticism. A first critique has to do with the restriction in the use of discrete variables. Blau and Duncan have measured both father's occupation and education as continuous variables, using the socioeconomic status index. Their model is based on the assumption that occupations can be assigned values and converted into a quantitative variable. By contrast, studies based on social classes use categorical variables in origin and destination, which makes impossible the application of path analysis. Nevertheless, some proposals of path analysis for categorical variables have also been developed (e.g., Eshima, Tabata, & Zhi, 2001; Kuha & Goldthorpe, 2010; Winship & Mare, 1983).

Second, some critics have questioned the directionality of variables in path analysis. In status attainment models, for instance, regression analysis assumes a lineal relationship between parental variables and those related to children outcomes. However, in analyses of this kind, a distinction between upward and downward mobility is often difficult to make. In order to solve this limitation, some studies have started to use alternative techniques, such as the transitions matrix. Nevertheless, literature on the topic in Colombia using this methodology comes to the same conclusions as the one based on regression models (García et al., 2015). Again, the model here does not face that problem: it is fully recursive

134 As early described by Wright (1934), the method of path coefficients is a flexible means of relating the correlation coefficients between variables in a multiple system to the functional relations among them. Therefore, path analysis is calculated using simultaneous equations which express the basic relationships between correlation and path coefficients. It should be noted, however, that correlation between two variables cannot inform about causal influences.

because all variables follow a temporal sequence. A related critical point concerns the issue of causality: causal interpretations of findings are normally coupled with simple linear logic. In words of Sobel (1992, p. 663) about Duncan's work on sociological methodology: "he always emphasized that structural equation models are a way to test theories, given a causal order, and not a way to establish causation". This study avoids the unwarranted tendency of some sociological studies in looking for causal inference when drawing a path diagram.

A third critique against linear regression models argues that these studies in educational research do not take into account the hierarchical structure of the data, as for example the grouping of pupils into classes, and the clustering of classes within schools. In these cases, there is an underestimation of standard errors, which may lead to spuriously significant regression coefficients. For that reason, multilevel modelling has been used more often lately (e.g., Goldstein, 1997; Murillo, 2008b; Raudenbush & Bryk, 2002). Multilevel models will be not considered here, as this study is one of the effects of *schooling* on individual's outcomes rather than one of *school* effects (Hallinan, 1988). Since the unit of analysis is that of the individual, the main concern is not in identifying which school characteristics have the strongest effect on achievement. In other words, research questions addressed here – i.e., the educational trajectories of graduates – are not about institutional effectiveness. Indeed, the aggregate-level analysis carried out here is one at the sectorial but not the school/university level. Even if a multilevel approach for studies like this would perhaps attenuate standard errors by dividing the explained variance across the hierarchical structure of the data into individual and sector levels, still a matter of concern would be a robust estimation of the multilevel model when incorporating complex path structures as the one of the present study.[135]

A final relevant criticism refers to the inclusion of unobservable or *latent variables* in path analysis, which cannot be measured directly and are treated as hypothetical constructs. Models containing non-observable variables may produce certain problems in estimating and testing (Hauser & Goldberger, 1971). *Structural Equation Modeling* (SEM) works as path analysis but with the inclusion of latent variables measured by sets of observed indicators. Even though some scholars prefer to use SEM as it allows working simultaneously with latent

135 For instance, when using multilevel software for some complex models, a common problem is that the iterative maximum likelihood procedure – as an estimation method – goes through an endless sequence and never reaches convergence, even with a data set with reasonable size (Hox, Moerbeek, & van de Schoot, 2017).

variables and hierarchical data, other authors continue to justify similarly the use path analysis (Kuha & Goldthorpe, 2010).

Despite these and other limitations, the classic model based on path analysis offers a powerful statistical framework for studies focused on individual trajectories over the life course, which embodies the main ideas of the status attainment approach: "linear scoring of occupational status and schooling, a typical ordering of events in the life course, and additive effects of each variable on its consequences" (Sewell & Hauser, 1992, p. 599). Since Blau and Duncan's publication, new methods of analysis haven been developed, such as log-linear and log-multiplicative models, event-history models, and multilevel models. Also, refinements to the model have been made, with special focus on the measurement of variables, the specification of intervening mechanisms, and the functional forms of equations (Mare, 1992). Beyond these sophisticated improvements, the classical model still constitutes a well-justified and powerful statistical tool that can represent complex ideas, as those worked by Blau and Duncan, which have not been reached by the application of new techniques: "Indeed, simple as it was and remains, we believe that the Blau-Duncan model reflects a more complete and coherent vision of the stratification process than appears in the models of intergenerational class mobility that now fill the research journals" (Sewell & Hauser, 1992, p. 602).

7.3 Variable Construction

Descriptive statistics are found in Annex G and detailed tables of the variable construction are in Annex H. Due to the existence of several variables of mixed nature (i.e., with categorical, ordinal, and interval data), it is necessary to combine different multivariate techniques in order to reduce information. With these techniques, six factors included in the model were constructed, namely: (1) social origin, (2) school type, (3) type of HEI (4) quality of HEI, (5) student performance in secondary education (SABER 11 scores), and (6) student performance in higher education (SABER PRO scores). In particular, the techniques employed here are: *Multiple Correspondence Analysis* (MCA) and *Principal Component Analysis* (PCA). All statistical models were performed with Stata version 13.

MCA is a descriptive, exploratory technique of categorical variables that usually permit researchers to identify associations between categories of a group of variables and represent them in a Euclidean space. The JCA (*Joint Correspondence Analysis*) is an alternative technique developed in 1988 by Greenacre

(2008) that optimizes the precision of the MCA.[136] In this study, JCA is employed because it allows summarizing a great deal of information from categorical variables in a reduced number of factors or dimensions at the interval level. It should be noted that it is an exploratory technique aiming at producing a simplified representation of the information. Therefore, no statistical significance tests are required.

Alternatively, PCA is the analogous technique to MCA for quantitative variables. It is a data reduction technique similar to factor analysis[137] with the purpose of generating a new set of uncorrelated orthogonal variables, called *principal components*. These components summarize the information contained in the original variables, reproduce the data structure, and capture their variability as much as possible. More precisely, PCA computes *eigenvectors* (i.e., a direction in the line), and the components are ordered by *eigenvalue* (i.e., a number) from the highest to the lowest. The eigenvalues indicate the percentage of the total variance that is explained by certain component.

In the following, the construction of each one of the variables/factors included in the model is described in detail. These variables are grouped together according to level: individual and institutional.

7.3.1 Individual-Level Variables

Social Origin

Social origin refers to the family's socioeconomic standing, which is traditionally captured by way of different measures. As shown in previous chapters, economists typically and understandably emphasize income measures, while most sociologists prefer occupation as the key category of differentiation, under the assumption that labor division is the backbone of social inequality (Ganzeboom & Treiman, 1996).

Within the sociological perspective, information on occupation is normally collected through census or official classifications composed of various hundreds

136 For a comparison of the advantages and disadvantages of both techniques, refer to Camiz and Gomes (2013).

137 For a discussion over the similarities and differences between PCA and factor analysis, see Jolliffe (2002).

of categories (e.g., ISCO[138]). These detailed classifications are later re-categorized according to scales. Researchers from diverse theoretical approaches have derived different scales, which can be grouped into two main kinds:[139] socioeconomic status indices and class categories. Originally, the class-status distinction comes from Max Weber's approach to social stratification, with a continuous measure of status being mostly common among North American scholars and the categorical concept of class more frequently used by European researchers.

Nominal class categories often combine information on occupation with information about employment. The most widely used is the EGP class classification, developed by Erikson, Goldthorpe, and Portocarero (1979).[140] It distinguishes between employer, self-employed, and employees with further distinctions based on level of skills, economic sector, and authority in the workplace. By contrast, socioeconomic indexes of occupational status, introduced by Duncan (1961, cited by Blau & Duncan, 1967), are the result of a weighted sum of relevant characteristics of a given occupation, usually education and income. In spite of the existence of various procedures to derive the weights, in general terms the resulting value reflects the expected income for a certain occupation, given the educational attainment exhibited in average by those who work in such occupational position. One of the most used scales of this kind is the ISEI,[141] which is widely used as a continuous measure for classifying individuals or households, in terms of indicators such as income, education, and occupation.

138 The Standard Classification of Occupations (ISCO) was developed by the International Labor Office (ILO) of the United Nations for the first time in 1958, with revisions in 1968, 1988, and more recently in 2008. It consists of a hierarchical system of four digits, which includes definitions and subcategories.

139 Nevertheless, some authors (Ganzeboom, de Graaf, & Treiman, 1992; Ganzeboom & Treiman, 1996, 2003; Hoffmeyer-Zlotnik & Wolf, 2003) identify a third type of scale which is based on prestige measures (e.g., the Standard International Occupational Prestige Scale developed by Treiman in the 1970s). Nowadays, prestige scores tend to be less used than socioeconomic status scales.

140 The EGP scheme distinguishes 12 categories based on different types of employment relations, but it is usually collapsed into 7 groups: (I) higher-grade professionals and managers, (II) lower-grade professionals, (III) higher- and lower-grade routine non-manual employees, (IV) small proprietors and farmers (V) lower-grade technicians, (VI) skilled manual workers, (VII) semi-skilled, unskilled manual workers, and workers in agriculture or primary production.

141 The International Socio-Economic Index of Occupational Status (ISEI) assigns a value on a numerical scale from 16 to 90 to each occupation classified according to ISCO. The ISEI developed for ISCO68 was constructed by Ganzeboom et al. (1992), with a later update for ISCO88 by Ganzeboom and Treiman (1996).

With Blau and Duncan's model, the wide use of the notion of socioeconomic status has led to the treatment of social stratification as a single continuous dimension, as it summarizes several distinctions by a single value. Among the critiques to the continuous approach, two are more frequent: first, stratification processes are multidimensional in nature, and second, intergenerational mobility is best studied from a categorical (class) perspective, as it shows the changes and tendencies between classes over time (Ganzeboom et al., 1992). Despite these critiques, the supporters of continuous approaches state that they allow graded distinctions between occupational groups, and that they can be captured numerically in a single dimension, which makes it possible to use a great variety of statistical techniques.[142] Furthermore, some authors argue that continuous scales may be multidimensional as well.

The present study takes the multidimensional character of social origin into account. However, it does not adhere to any particular conceptual approach of measuring it. As far as multidimensionality is concerned, the differential impact of the estimated effects of parents' earnings and education in many studies suggests that social origin should not be considered as one-dimensional (Mastekaasa, 2011). A similar idea had been expressed by de Graaf, Ganzeboom, and Kalmijn (1989), who have argued that with the appearance of innovative statistical techniques (e.g., multivariate models), alternative research questions about the relative importance of different dimensions of social inequality have been introduced, instead of relying on one dimension as the "best single indicator" (Blau & Duncan, 1967, pp. 6–7). As for the second concern, conceptual debates around the status-class distinction have faded or are not used at all in the empirical tradition (Chan & Goldthorpe, 2007).

The data set built for this study includes a great deal of relevant information about social background, such as both parental occupation and education, as well as family income (see variables of social origin in Table G. 1 of Annex G). Instead of emphasizing one of these dimensions over the other – and, thus, favoring a particular disciplinary orientation – I decided to use various indicators. Social origin in the model is a composed factor of two major dimensions: (i) the household's economic resources and (ii) parental education. For the present study, the main purpose of doing this differentiation instead of using a composite index is exploring the relative importance of both dimensions on different individual outcomes, which makes it possible to identify the underlying mechanisms whereby social origin operates in the production of IEO.

142 The advantages of analyzing intergenerational mobility using continuous measures are widely acknowledged (see: Neckerman & Torche, 2007).

Economic Resources

For the construction of this factor, the following variables were employed: family income at the time when individuals took the SABER 11 test, house ownership, and parental occupations. Even though the inclusion of additional socioeconomic information would be desirable for the construction of a more complete factor, the information included here was limited by what is available in the data set.[143] The term *economic resources* will be occasionally referred here as *economic capital*.

Household income is an ordinal, quasi-metric variable with 10 values given in terms of monthly minimum wages (from less than 1 until 15 or more). The categorical variable related to house ownership includes 3 values: the family rents a place to live, the family owns the property but has partially paid for it, and the family owns the property which is fully paid. In addition, due to the fact that parental occupational variables in the SABER 11 database are treated as nominal variables composed of 12 categories, it is not possible to construct a socioeconomic status index, such as the ISEI. In contrast to many previous works in the country, however, the present study includes information on occupations of both parents. Until the early 1980s, studies on intergenerational social mobility in industrialized countries only used information about income or class/occupational status for the male family head. Afterwards, as a consequence of the increase of women's participation in the education system as well as in the labor market, stratification research started also to collect and measure information on mother's education and occupation (Blossfeld, 2007).

Taken all four sets of variables into account, a JCA was conducted to obtain the factor of economic resources. Although this descriptive technique emphasizes the graphical representation of relational data, the visual output in this case was not very illustrative. Table 15 shows the two-dimensional JCA solution. Given that the first dimension captures 55% of the total inertia – which is the discriminatory capacity of the original categories – the second one will be not considered.

143 It should be noted that the SABER 11 databases also include variables related to household's asset conditions, such as possession of electrical appliances, house's construction materials, type of toilette facilities, and computer/Internet access, among many others. However, this information was either not available for the year selected in this study or had considerable missing data.

Table 15: JCA solution for economic resources

Variable	Total		Dimension 1		Dimension 2	
	Mass	% Inertia	Score	Contrib.	Score	Contrib.
House ownership						
Rented place	0.06	0.01	-0.53	0.02	-0.33	0.01
Family-owned property (PP*)	0.07	0.01	0.35	0.01	0.37	0.01
Family-owned property (FP*)	0.13	0.00	0.05	0.00	-0.05	0.00
Family income (in SMMLV**)						
Less than 1	0.02	0.06	-2.04	0.09	-1.42	0.04
Between 1 and <2	0.07	0.05	-1.16	0.09	-0.32	0.01
Between 2 and <3	0.06	0.01	-0.23	0.00	0.30	0.01
Between 3 and <5	0.06	0.03	0.80	0.04	0.58	0.02
Between 5 and <7	0.03	0.05	1.60	0.08	0.52	0.01
Between 7 and <9	0.01	0.02	2.49	0.03	-0.88	0.00
Between 9 and <11	0.00	0.01	-2.27	0.01	-0.47	0.00
Between 11 and <13	0.00	0.02	3.14	0.03	-1.97	0.01
Between 13 and <15	0.00	0.01	2.94	0.01	-2.35	0.01
15 or more	0.00	0.01	2.89	0.02	-1.55	0.01
Father's occupation						
Entrepreneurs	0.01	0.12	3.72	0.08	-7.77	0.33
Chief executives	0.01	0.03	1.84	0.03	-0.83	0.01
Independent professionals	0.02	0.03	1.22	0.03	0.02	0.00
Employed professionals	0.04	0.05	1.33	0.07	0.99	0.04
Students	0.00	0.00	1.02	0.00	0.22	0.00
Stockholders	0.00	0.01	0.48	0.00	-0.32	0.00
Retired	0.02	0.01	0.23	0.00	0.52	0.00
Independent workers	0.08	0.03	-0.57	0.03	0.32	0.01
Employed workers	0.04	0.02	-0.51	0.01	0.73	0.02
Unemployed	0.01	0.01	-0.56	0.00	0.02	0.00
Domestic/house tasks	0.00	0.00	-1.40	0.00	-0.53	0.00
Manual workers	0.03	0.08	-1.86	0.09	-2.07	0.11
Mother's occupation						
Entrepreneurs	0.00	0.08	4.37	0.05	-9.85	0.23
Chief executives	0.01	0.03	2.34	0.03	-1.92	0.02
Independent professionals	0.01	0.03	1.89	0.03	-0.39	0.00
Employed professionals	0.04	0.05	1.38	0.07	0.88	0.03
Students	0.00	0.00	0.75	0.00	-0.87	0.00
Stockholders	0.01	0.01	0.74	0.00	0.78	0.00
Retired	0.00	0.01	0.39	0.00	-0.13	0.00
Independent workers	0.03	0.02	-0.25	0.00	0.43	0.01
Employed workers	0.04	0.02	-0.19	0.00	0.73	0.02
Unemployed	0.01	0.00	-0.23	0.00	0.36	0.00
Domestic/house tasks	0.11	0.03	-0.57	0.04	-0.18	0.00
Manual workers	0.01	0.04	-2.23	0.03	-2.82	0.05
Inertia	0.19		0.11		0.04	
% Inertia	100		55.06		21.05	
n						**12,899**

Source: Own elaboration.

Notes: *PP: partially paid; FP: fully paid. **SMMLV: *Salario Mínimo Mensual Legal Vigente* stands for the monthly minimum wage.

According to the first dimension, the categories of income and parental occupation clearly show a consistent variation that reflects their ordinal character. Occupations with high scores (i.e., entrepreneurs, managing directors/chief executives, professionals) indicate high income; on the other hand, manual workers, those in charge of domestic/house tasks, and those unemployed exhibit low scores which indicate low income. Retired people and stockholders are in an intermediate position in terms of income, as well as the students. The situation of the last group might be explained by the fact that they are likely to receive some financial support from their families. In general terms, mothers' occupation generates more variation, probably because their job positions are more heterogeneous.

Regarding the house ownership variable, the category of 'partially-paid property' obtains a better score than the category of 'fully-paid property'. A possible explanation of this situation would be that medium-high income families are most likely to have access to credits for buying houses of high value and, presumably, this leads to longer payment periods. It is notorious, however, that those who do not own their house do get considerably low scores.

Cultural Resources

The second dimension of social origin in the model consists of the family's *cultural resources*, measured by means of the parents' educational credentials. Although the construct of cultural capital is broadly employed in studies on educational inequalities, there is no consensus on how to measure it. Parental education (i.e., institutionalized cultural capital, as defined in Chapter 4) is the most common measurement. However, whether parents' educational attainment actually reflects the possession of cultural capital has been widely under discussion (e.g., Sullivan, 2001), as education is not the only component of cultural capital: socialization processes and cultural consumption are also part of it (i.e., objectified and embodied forms of cultural capital).

Accordingly, another extended way to measure cultural capital is related to the idea of consumption of conventional 'bourgeois' aesthetic culture through variables about the family's interest in cultural activities, such as attending artistic events, performing music, reading literature, or visiting museums, galleries, theatres and historical buildings.[144] Other items have also been analyzed as symbols of cultural resources, such as political opinions, eating habits, aesthetical preferences, etc. Those symbols are argued to be indicators of the individuals'

144 For a critical discussion on this perspective, see: Lareau and Weininger (2003).

status, according to the cultural reproduction theory. Studies based on this tradition claim the existence of an *elite closure* model – inspired by Bourdieu and his followers – whereby gatekeepers, teachers, and employers recognize the individuals' cultural signals, which allow them to identify elite members and exclude others.

The number of books in the family home has been increasingly used as an indicator of cultural resources. Several empirical studies (e.g., de Graaf, de Graaf, & Kraaykamp, 2000; Evans, Kelley, & Sikora, 2014; Evans, Kelley, Sikora, & Treiman, 2010) have analyzed how often families read and use books, as a common practice clearly associated with higher educational attainment in most countries, after controlling for social class and other factors. The evidence provided by these studies suggests that the home library size as well as parental reading behavior have greater influence on children's educational outcomes than family 'beaux arts' participation. The number of books has also been found to have a stronger positive effect on years of schooling than father's education and occupation, net of other influences (Evans et al., 2010). Likewise, the importance of reading at home has been object of interest for studies addressing inequalities in academic performance associated with social origin during school and summer periods. For instance, findings for the city of Berlin interestingly indicate that the reading achievement disparities increase during summer vacations among socioeconomic groups (Becker, Stanat, Baumert, & Lehmann, 2009). Overall, these findings seem consistent with the thesis introduced by Spaeth (1976, as cited in Evans et al., 2014) – and opposite to the idea of elite closure – which suggests that *scholarly culture* entails educational advantages by providing cognitive skills that improve children's academic performance, which in turn is rewarded by schools.

Another way of measuring family's cultural resources in the empirical research is around the notion of parenting style. For instance, Lareau (2003, pp. 1–13) shows that parenting styles differ by social class: middle-class children show a pattern of "concerted cultivation", whereas a style of "accomplishment of natural growth" is more prevalent in the working class. According to this qualitative study, parenting styles include three aspects: degree of structuration of leisure activities in children's daily life, family's use of language (i.e., vocabulary, negotiation, and reasoning skills), and parental engagement at school. Drawing on this work, Cardona, Diewald, Kaiser, and Osmanowski (2015) propose an innovative quantitative measure of cultural capital. They found, as underlying mech-

anisms of cultural capital in academic performance, the combined effect of individual's general skills – indirectly fostered by structured leisure activities – and teacher discrimination.

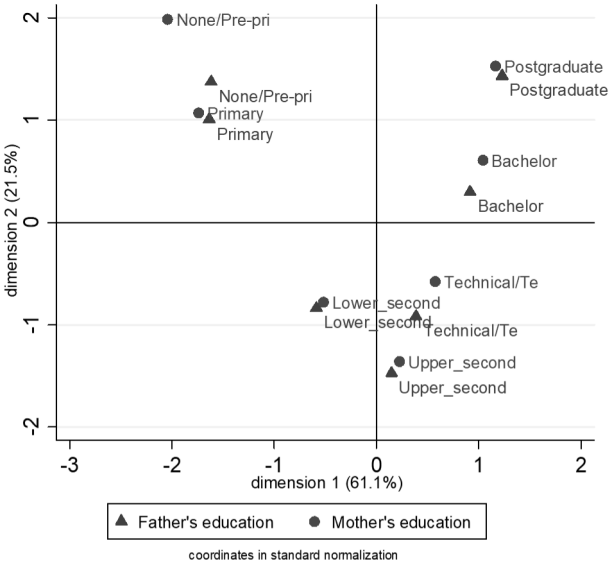
Although various forms of measuring this concept have been developed, educational credentials of parents are still the most common indicator. Indeed, in the literature of social mobility, the use of other indicators, such as cultural consumption has been often neglected (Huerta, 2012). In this study, since the number of books was not available in the data set, nor were other variables of culture consumption, the level of parental education will be used as a proxy of cultural capital. At the expense of oversimplifying the complexity of this construct, the terms *cultural resources*, *parental education*, and *cultural capital* will be used interchangeably throughout the book.

Typically, studies have used only educational information about the father. More recently, studies have emphasized the importance of the mother's characteristics in the individuals' educational achievement (Beller, 2009; Korupp, Ganzeboom, & van der Lippe, 2002). Some other studies have employed the parent's highest educational level, regardless of whether it is the father or the mother. For example, Jonsson (1987) shows that if one parent is well-educated, the child is likely to attain also a high level of education, no matter what education the other parent has. In the developing world, the mother's education has shown to have a significant impact on educational outcomes (Torche, 2005). Similarly, the mother's number of schooling years has been the most used indicator in the Latin American region (Fernández, 2002). Also, in the Colombian case there is strong evidence of the major importance of the mother's level of education on individual outcomes (Psacharopoulos & Vélez, 1993; Tenjo & Bernal, 2004). This tendency could be attributed to the traditional role of women in the educational processes of children, particularly in non-industrialized nations.

Similar to the construction of the economic resources' factor, the JCA technique was also used for constructing the factor of cultural capital. Graph 9 displays the JCA plot of parental education variables. Table H. 1 of Annex H shows the percentages of inertia, scores, and other related information in detail. As noted in the JCA graph, the output simultaneously displays father's education in triangles and the mother's education in circles. Dimension 1 captures 61% of the inertia and the scores of categories are consistent: low values correspond to low educational attainment and high scores are for those parents with higher education credentials. Considering this dimension, which is more informative than the second one, similar levels of education of parents tend to attract each other, in

three major groups, namely: a first group of parents with less than primary education; a second one with secondary and T&T levels of education; and the third with higher education qualifications. Moreover, mother's education shows scores away from zero and produces more variation in almost all categories of the variables: higher scores in secondary and higher education, and lower scores in primary or less.

Graph 9: Loading plot for JCA of parental education



Source: Own elaboration.

Student Performance in Upper Secondary Education

Over the years, the structure of the SABER 11 test as well as the score scale and the number of questions have changed. These changes entail some constraints when making comparisons across years. However, this is not a limitation for this study, as only the application of year 2003 was selected. The overall structure of the test between 2000 and 2007 consisted of three main components (ICFES, 2013a): (i) a common core content, (ii) a flexible content, and (iii) proficiency in a foreign language. The first component was the same for all students and included questions on the following 8 subjects: Language, Biology, Mathematics,

Philosophy, Physics, History, Chemistry, and Geography. The second component included two subtests: a specialized one and an interdisciplinary one. While the former included more specialized questions in one subject chosen by the student among Language, Mathematics, Biology, and History; the latter included items on interdisciplinary areas such as 'Environment' or 'Violence and Society'. Lastly, the third component of the exam assessed proficiency level in a foreign language (English, French or German).

For comparative purposes, only the scores in the common subjects of SABER 11 test were selected, thus excluding the flexible content and the foreign language parts of the exam. Prior to the analysis, scores were standardized to have a mean of zero and a standard deviation of one. Descriptive statistics of these scores are summarized in Table G. 2 of Annex G. Based on PCA techniques, a global score was generated in order to put together all scores obtained in the 8 subjects. The results of PCA are summarized in Table 16. The second column lists the 'eigenvalues' of the correlation matrix, or in other words, the variances of the principal components. The third column indicates how much of the 'total variance' over all the eight variables is explained by each component.

Table 16: PCA solution for SABER 11 scores

Factor	Eigenvalue	Explained total variance
Comp1	3.98	0.50
Comp2	0.93	0.12
Comp3	0.70	0.09
Comp4	0.62	0.08
Comp5	0.51	0.06
Comp6	0.45	0.06
Comp7	0.43	0.05
Comp8	0.37	0.05

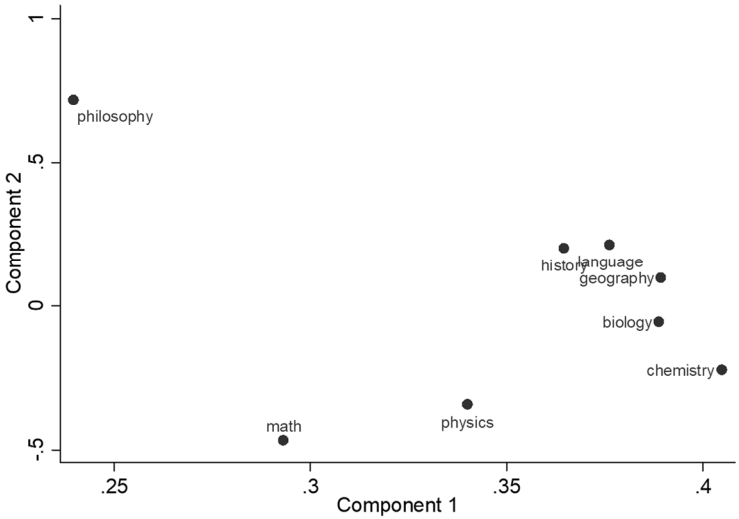
Source: Own elaboration.

The output indicates a two component solution, that is, the first two components capture enough variance in the full set of variables.[145] The first one is very strong with an eigenvalue of 3.98, which explains 50% of the total variance. The second component has an eigenvalue 0.93 explaining 12%. To learn more about the underlying structure of the data, the eigenvectors from the PCA are presented in Table H. 3 of Annex H. For a more illustrative exposition, the first two principal

145 Indeed, components with an eigenvalue less than 1 should not be considered.

component loadings are plotted on the Graph 10. As observed in the first component, the score relevance of all variables is very similar (especially those of history, language, geography, and biology tests), being moderately lower for math (0.29) and philosophy (0.24). From the second component, the difference in philosophy scores also stands out. Since "any factor with an eigenvalue of less than 1.0 can usually be ignored" (Acock, 2013, p. 5), here only the first component is taken into account. A unique SABER 11 score is then derived from this one-component solution with the first component accounting for about half of the total variability.

Graph 10: Loading plot for PCA of SABER 11 test scores: two components



Source: Own elaboration.

Student Performance in Higher Education

The information on academic performance in higher education is taken from the individual scores in the SABER PRO test. The structure of the exam is divided into a general subtest and a subject-specific one. In higher education, the distinction between generic and specific competencies is traditionally made. While the former refer to specialized knowledge and skills in a certain subject as the basis for undergraduate programs, the latter denote transferable skills which are independent of the field of study and that prepare students for their role in society in

terms of employability and citizenship. Modules assessing generic competencies are key for comparative purposes between different programs.

However, in the first years of its administration, not all first-degree programs had both components. Besides, only until 2009 the exam became mandatory for all undergraduate students as a graduation requisite. Consequently, comparison of scores between programs or fields of study for the waves before 2009 should be treated with caution. Furthermore, because of the substantial variations of the exam since its first implementation, there are diverse versions of the generic component that include different modules, which makes the comparison of generic competencies scores across years difficult. For the years selected in this study (2007–2010), the SABER PRO exam assessed at least two generic competencies: reading comprehension and English (ICFES, 2009, ICFES, 2016). It is possible, however, that some programs before 2009 were not yet evaluated (ICFES, 2010) because only until 2012 the set of SABER PRO tests was organized by reference group and not by field of study.

For comparative reasons, only scores in the reading comprehension module were selected as an indicator of individual performance in higher education. Even though this decision considerably reduces the information included in SABER PRO, it was the only way to carry out the planned analysis. Reading scores from different years were comparable because since 2007 there is a unified scoring system with a mean of 100 and a standard deviation of 10. Additionally, standardized scores by year were calculated in order to conduct analyses of scores between individuals, programs, and years. Descriptive statistics of SABER PRO scores are found in Table G. 2 of Annex G.

Income

Under the aim of analyzing the occupational trajectories of bachelor's graduates, a major obstacle found was the limitation of the data set. The population analyzed here (cohorts 2007–2011) had little or no experience by the time OLE collected the information (2010–2011). This implies that the 'observation window' here is restricted to the initial work experiences. Although those data may not necessarily represent the final occupational destination of individuals, they are key in the future prospects of occupational lives (Solís & Blanco, 2014). Nevertheless, apart from income and type of tax contribution, the only variable included in the OLE data set referring to the job is restricted to the economic activity. From this last variable, which is constructed according the International Standard Industrial Classification of All Economic Activities (ISIC) adapted to the national context,

it was not possible to extract information about the characteristics of the occupation, neither its status nor position. The only analysis that could be conducted from this information was limited to the match (or mismatch) of the bachelor's field of study and the job's economic activity. Although the relevance of an analysis of this kind cannot be discussed, further conclusions about occupational destinations among individuals in terms of stratification of positions cannot be derived from it. Therefore, the analysis conducted here is then based exclusively on income, which has not been the trend within sociological studies. Descriptive statistics of this variable are in Table G. 5 of Annex G.

7.3.2 Institutional Variables

Type of School

As argued in the theoretical framework, institutional features might be important issues of differentiation among students at the same educational level, which might determine their academic achievement and subsequent outcomes. Characteristics of school type are considered as a result of the educational decisions made by students and/or their families. It is should be noted, however, that the focus here is not on exploring the mechanisms behind these decisions. The data set does not allow knowing the particular preferences, expectancies, opportunities or constraints that have governed parental school choice. Nevertheless, the model proposed for this study permits to identify whether social origin has an impact on the choice of certain school type.

For the present analysis, the information on the school was gathered through the SABER 11 database. This means that the school characteristics are those of the educational institution where individuals have completed Grade 11 at upper secondary education, which might be different to the one they have attended during primary education. The variables under consideration for the construction of the school type factor were primarily derived from the review of studies on factors associated with learning in Colombia (see Chapter 6), in terms of their predominance and relevance. The selection of variables, however, depended on the information available in the data sets (for instance, information of teachers' characteristics is not accessible from the data). Among the several institutional characteristics that specify a school – and that are related to student achievement levels – the following five variables were considered here: (i) private/public sector, (ii) curriculum orientation, (iii) school day, (iv) school calendar, and (v) location.

The values and descriptive statistics of this set of variables are summarized in Table G. 3 of Annex G.

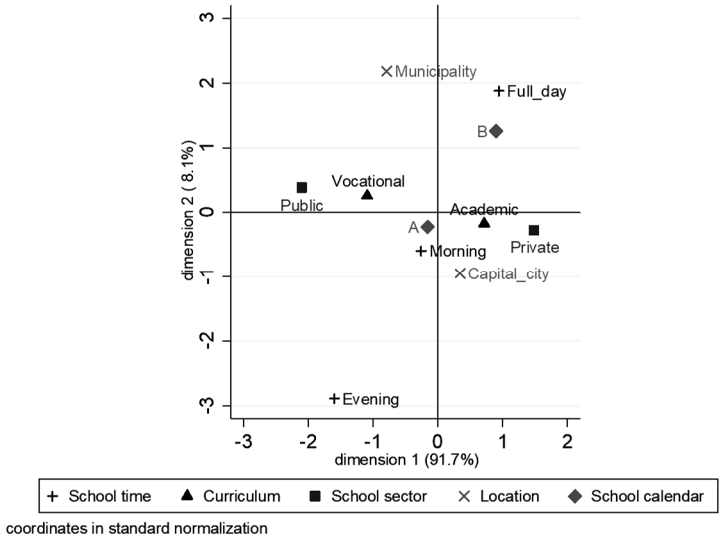
Regarding school sector, as described in the review of the Colombian literature, most studies have constantly found better performance in standardized tests among students from private schools than among those from public ones. In spite of this tendency, the existence of substantial differences within groups of schools should be kept in mind. On one hand, private schools in the country are rather heterogeneous. For instance, Gamboa (2012) identified three school types: high-quality private schools; moderate-quality private schools; and public schools. On the other hand, although average scores in standardized tests favor private schools, there are also a few high-quality public schools with better performance than many private institutions (Tenjo & Bernal, 2004). The heterogeneity among private schools has been accounted for in part by the existence of differentiation features, such as: resources, infrastructure, teacher training, student-teacher ratio, socioeconomic conditions of students, as well as unobserved characteristics related to management, leadership, and community issues. By contrast, this degree of diversity does not occur in the case of public schools, mostly because they have relatively little control over many institutional characteristics, and especially those of their student population (Hallinan, 1988).

Concerning the curriculum orientation, this study takes into account a general level of differentiation in upper secondary education, namely: the division between academic and vocational tracks. As discussed previously, strictly speaking, tracking or ability grouping according to the curriculum orientation does not exist in Colombia. In the data set for this study, three major categories were found: academic, vocational, and *escuela normal*. The latter category, which refers to specialized institutions for training school teachers, was not included since there were only very few cases (2.4% out of the total of observations).

In relation to school day, three main categories were established: full-day schools, half-day schools (morning shift), and half-day schools (evening shift). All other variations of weekend or night class schools were ignored, as there were too few cases (0.9% out the total of observations). Regarding school calendar, the category F calendar was also excluded for the same reason (1.7% of the total of observations). With respect to location, residential segregation in major cities or the large urban/rural divide, could not be addressed in this study. Instead, the variable used allows a gross classification of institutions into two main groups: those located in capital cities of departments in comparison to those located in other municipalities.

The factor of school type was constructed based on the JCA technique. Graph 11 shows the generated joint plot and Table H. 2 of Annex H presents the output in more detail. The factor is quite robust: the first dimension captures 91.7% of the variation included in the variables. Given the overwhelming dominance of the first dimension, the second one will be not considered as it is less informative. The output is highly consistent: positive scores for private, full-day, academic schools with B calendar, and located in major cities. By contrast, negative scores are assigned to schools that share the following features: public, half-day (morning or evening), A calendar, vocational curriculum, and located in peripheral municipalities.

Graph 11: Loading plot for JCA of school type



Source: Own elaboration.

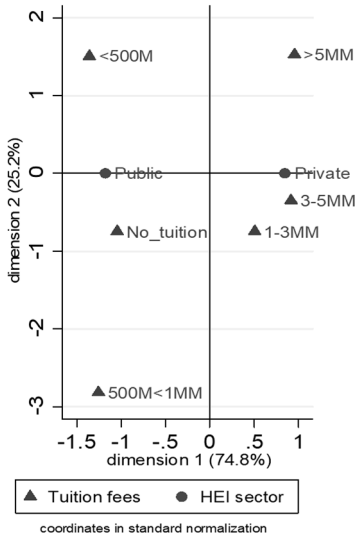
Based on this reduction of information, and only for analytical purposes, this document will distinguish between two major categories of schools according to the scores displayed in the JCA output. On one hand, the 'first-tier schools' that include those institutions with the following characteristics: private, full-day, academic curriculum, B calendar, and located in major cities. On the other hand, the 'second-tier schools' that include institutions characterized by: public, half-day, A calendar, vocational curriculum, and located in peripheral municipalities. Nevertheless, this oversimplification does not capture the great heterogeneity of

schools that actually exists in the country, which includes different combinations of features between the two opposing categories. In particular, this deliberate classification of schools needs to be taken carefully, as it does not discriminate between rural public schools, on the one hand, and private schools in the countryside, on the other. Although private schools in Colombia are primarily located in urban areas, by 2014 five percent of students attended private elite schools located in rural areas (the so-called *colegios campestres*) (OECD, 2016a).

Type of Higher Education Institution

The factor of HEI type was constructed on the basis of two characteristics: private/public sector and semester tuition fees. Regarding the latter, the ordinal variable has 6 categories, from a range between no cost and COP 5 million (MM) or more (see Table G. 4 of Annex G for descriptive statistics). Using JCA techniques, the resulting output in Graph 12 shows that the first dimension captures 75% of inertia. As expected, the composing categories of the two variables are correlated: lowest scores indicate public institutions without tuition fees or low cost. Conversely, high scores are assigned to private HEIs with higher tuition costs. For more details on the output, see Table H. 4 in Annex H.

Graph 12: Loading plot for JCA of HEI type



Source: Own elaboration.

Quality of Higher Education Institution

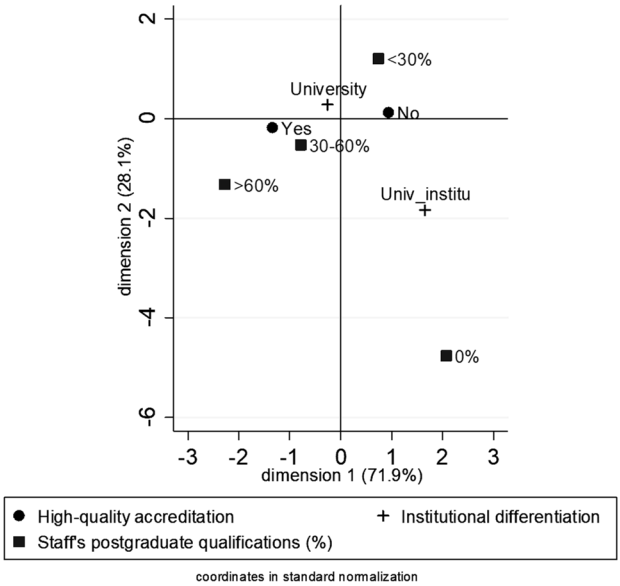
Although this factor does not measure quality directly, it refers to quality-related aspects of higher education, which include: institutional differentiation, accreditation, and staff qualifications (descriptive statistics of these variables are found in Table G. 4 of Annex G). The first variable distinguishes between universities and university institutions, the former being more research oriented, while the latter are professional-oriented institutions. As argued before in Chapter 5, this formal distinction has been accompanied by heterogeneous quality: only 2% of the total of university institutions have been accredited by 2013, whereas this percentage is 33% in the case of universities. Institutional accreditation, as the result of quality assurance mechanisms, is taken here as a proxy of quality of higher education provision. Initially, the variable to be included in the factor construction was accreditation of the HEI, but only a few institutions were found to be accredited in Colombia. The variable refers to whether the bachelor's study program has been recognized with high quality accreditation or not. Lastly, the variable about staff qualification was incorporated in the factor, measured by means of the percentage of professors with a Ph.D. or Master's certificate. The categories of this variable are: 0%, less than 30%, between 30–60%, and more than 60%. The information about the professors' credentials within HEIs – not included in the OLE database – was collected from SNIES database (2010-2011) by calculating this percentage for each HEI seat across country regions.[146]

Similar to previous constructs, JCA techniques were used to define the factor of HEI quality. Table H. 5 of Annex H summarizes the output and Graph 13 illustrates the plot. As observed, 72% of inertia is captured by the first dimension: positive scores are associated with research universities with high quality accredited programs and whose academic staff is composed of professors with postgraduate titles. In contrast, low scores are assigned to university institutions with non-accredited programs and teachers with less education.[147]

146 Important variations among different seats of the same HEI were found: HEI seats in main cities are most likely to have more highly educated professors in comparison to those HEI seats located in peripheral regions.

147 It is worthwhile noting here that low values indicate universities with high staff qualifications and high-quality accreditation, and vice versa. Graph 13 preserves this as produced in the output of the statistical software. For the purposes of the OLS analysis, however, the sign has been inverted.

Graph 13: Loading plot for JCA of HEI quality



Source: Own elaboration.

8 Effects of Social Origin on Educational and Labor Outcomes

The results of the empirical exercise will be presented in three parts. The first section conducts the regression models determining the graduates' educational and labor outcomes. The second section adds interactions of explanatory variables to the regression models. Finally, the third section estimates the direct, indirect, and total effects of the path analysis.

8.1 OLS Models

Multiple lineal regression models (OLS) were fitted to estimate the relative impact of social origin variables – economic and cultural capital – on: (1) school type, (2) SABER 11 scores, (3) HEI type, (4) HEI quality, (5) SABER PRO scores, and (6) income. The regression output of the six resulting models is summarized in Table 17. The Inverse Mills Ratio (IMR) was included as an additional control variable in all six OLS models.

Overall, all models are statistically significant. The *p-values* associated with the *F-test* are very small (0.0000), which means that the independent variables reliably predict the dependent variables. The parameter estimates are given in standardized coefficients (Beta),[148] which allow assessing the relative strength of each dependent variable considered in the model, as they are all measured in standard deviations. The table also provides information on the R^2, which indicates the proportion of the variance in the dependent variable that can be predicted from the independent variables. Even though *adjusted* R^2 values are moderate, they are higher than 0.1, indicating that 10% or more of the variance of the dependent variable in each case is explained by the variables assessed in the models. Arguably, other variables that are not considered in the model might affect the dependent variables, including also other ascriptive conditions, such as place of birth and residence (rural/urban and country department), family structure, number of siblings, etc. Nevertheless, the main purpose here is not to estimate the net effect of all possible variables playing a role in the determination of individual's outcomes. Instead, the present study aims at evaluating the overall dynamics of IEO across upper secondary and higher education trajectories using two standard indicators of social origin.

148 Beta coefficients are those obtained if the outcome and predictor variables were all transformed into standard scores (i.e., z-scores) before running the regression (IDRE, 2018).

Table 17: Multiple linear regression models (OLS)

	Model 1 School type	**Model 2** SABER 11	**Model 3** HEI type	**Model 4** HEI quality	**Model 5** SABER PRO	**Model 6** Graduate income
Independent variables						
Economic resources (EcoR)	0.30 ***	0.12 ***	-0.22 ***	0.11 ***	0.03 **	0.05 ***
Cultural resources (CulR)	0.20 ***	0.47 ***	-0.02	0.25 ***	0.09 **	0.19 ***
School type		0.17 ***	-0.26 ***	0.05 ***	0.00	0.02 **
SABER 11			0.17 ***	0.36 ***	0.30 ***	0.17 ***
HEI type					0.03 ***	-0.11 ***
HEI quality					0.04 ***	0.10 ***
SABER PRO						0.01
Control variables						
Sex	-0.02 **	-0.10 ***	0.03 ***	0.04 ***	0.04 ***	-0.03 ***
Birth year	-0.17 ***	0.11 ***	0.05 ***	-0.04 ***	0.02 ***	-0.01
Graduation cohort						-0.10 ***
Overall model fit						
Coef. F	1,300.95 ***	449.14 ***	734.62 ***	480.07 ***	206.20 ***	184.47 ***
R^2	0.29	0.15	0.25	0.17	0.10	0.11
n	15,772	15,771	15,770	15,771	15,770	15,770

Source: Own elaboration.

Notes: Standardized coefficients (Beta). Adjusted R^2 was omitted as it is identical to unadjusted R^2 in all instances.
*p ≤ 0.10 ** p≤0.05 ***p≤0.01

R^2 is particularly high in those models related to type of educational institution: approximately 25% of the variability of the HEI type factor and 29% of the school type factor are accounted for by the set of independent variables considered. These fit statistics indicate that the type of educational institution at both educational levels is, indeed, strongly affected by the set of social determinants measured in the present study. It is therefore possible to say that the data illustrate how the distinction among institutional types in the Colombian education system may be an important instance of qualitative or horizontal differentiation.

8.1.1 Model 1: Determinants of School Type

Model 1 estimates the effects of social origin on the school type attended. For that purpose, the impact of both economic resources (EcoR) and cultural resources (CulR) is modeled on school type factor, controlling by sex and birth year. As shown in Table 17, regression coefficients of social origin factors have positive and significant effects. EcoR has the largest coefficient (.30), meaning that one standard deviation increase in the economic resources would yield .30 standard deviations increase in the predicted school type, with the other variables held constant. In other words, students coming from families with high socioeconomic background are more likely to go to first-tier schools.[149] On the other hand, once EcoR is controlled, CulR also has a positive effect (.20) which means that for every standard deviation increase in the cultural capital variable, the factor of school type is predicted to be .20 standard deviations higher. In other terms, students with highly-educated parents tend to attend first-tier schools. For those whose parents have low schooling levels, the contrary occurs; they are more likely to finish secondary education in second-tier schools.

With respect to the control variables, a final comment is worth being noted. Even though the target population is defined as those students who have finished upper secondary education in 2003, the age range varies between those born between 1983 and 1988. As shown in the table, birth year has a negative effect on the school type (-.17), meaning that the younger the individual – or the higher

149 As mentioned in Chapter 7, this study adopts a simplified (deliberated) categorization of school types according to their characteristics at the sectorial level that are relevant for the present study. The 'first-tier schools' refer here to those institutions with the following characteristics: private, academic, full-day, B calendar, and located in capital urban centers. By contrast, the 'second-tier schools' have the opposite features: public, vocational curriculum, half-day, A calendar, and located in peripheral municipalities

the year of birth – the lower the factor of school type. This might be explained by the progressive expansion of higher education in the country over recent decades. With this growth, the probability of accessing higher education for students from different types of schools has increased, including those secondary schools that were not traditionally associated with the preparation of pupils for pursuing university studies (e.g., some vocational schools). Furthermore, regarding the sex variable, female students have a moderate disadvantage as to the school type they attend (-.02). It seems that parents are more willing to send their male children to schools with characteristics associated with high quality. A further exploration of these patterns, however, is not the focus here as both sex and birth year are not explanatory but just control variables in the model.

An additional aspect that requires analysis is the *multicollinearity*[150] between social origin factors. For that purpose, the covariation model among economic resources, cultural resources, and sex was examined. Coefficients in Table 18 show that these three variables are not independent. As expected, the relationship between socioeconomic background and parental schooling is positive and strong. The association of these two dimensions (i.e., economic and cultural capital) of family conditions is not surprising and also congruent with social stratification studies. Since the correlation coefficient is far from the conventional threshold of.80, there is no need to deal with the multicollinearity pattern in the regression analysis.[151] An advantage of not removing or combining the predictors is the possibility to analyze social origin by separating the family resources into economic and cultural dimensions, which in turn permits to assess their relative effects on different dependent variables in the model. Furthermore, the relationship between sex and social origin variables is statistically significant and inverse, which indicates that within the population selected for this study, women come from families with lower socioeconomic and cultural resources than those of men. Nevertheless, the magnitude of this correlation is small.

150 It refers to an existing linear correlation between two or more predictors in a regression analysis, leading to unstable estimates of regression coefficients, making them difficult to interpret (IDRE, 2018).

151 Multicollinearity is problematic when the correlation between predictors is high ($r \geq .80$) or perfect (singularity r=1), which exposes their redundancy. In these cases, solutions include omitting or combining variables (Wulder, 2002; Franke, 2010).

Table 18: Correlation matrix between predictor variables: social origin factors and sex

	EcoR	CulR	Sex
EcoR	1		
CulR	0.6699 ***	1	
Sex	-0.0612 ***	-0.0600 ***	1

Source: Own elaboration.
Notes: *p ≤ 0.10 ** p≤0.05 ***p≤0.01
EcoR: economic resources; CulR: cultural resources.

By and large, Model 1 shows a strong influence of family conditions on the choice of secondary school, with the household's economic resources having a stronger impact than parental education. This finding indicates that it is primarily parents' wealth which motivates or enables them to pay for what they consider a high-quality secondary education in private B calendar schools, most of which are bilingual. This way, they strive to maximize their children's opportunities in the labor market via an academic curriculum oriented to higher education entrance and the acquisition of a second language. Cultural capital also plays a key role. In this line, Pereyra (2006) found for Latin American nations that even in the case of households from the five lower deciles of income per capita, parents with high levels of education choose to send their children to private schools.

8.1.2 Model 2: Determinants of Academic Achievement in Secondary Education

Model 2 estimates the effect of social origin variables and school type on student performance in SABER 11 test. Once the Inverse Mills Ratio (IMR) as well as other control variables are held constant, parental education has the greatest effect (.47) on obtaining high scores, meaning that an increase of one standard deviation in the schooling level of parents yields additional .47 standard deviations in the predicted score in SABER 11. This result echoes the abundant literature showing that students coming from culturally cultivated homes are more likely to perform outstandingly in standardized exams. Although cultural capital – either measured by parental education or other related resources such as home library size – has been consistently correlated with academic achievement in subjects like reading, mathematics, and science, the present study also shows that the same is true for other subjects less commonly analyzed (e.g., history).

The second strongest coefficient is that of school type (.17). As expected, and consistent with the review of national studies, high SABER 11 scores are more

common among pupils from private, academic, full-day, B calendar schools, located in capital urban centers (e.g., Gaviria & Barrientos, 2001a). Similar results have been obtained from PISA scores. For instance, Barrera, Maldonado, and Rodríguez (2012) have found that the improvements observed among Colombian students between 2006 and 2009 are mostly due to better scores obtained by those from private institutions, whose mothers hold high educational credentials, and live in big cities. Furthermore, economic resources (.12) have also a positive, yet moderate impact on academic achievement in secondary education. This pattern has been widely confirmed in the national context, where it has been argued that the key impact of the socioeconomic stratum on SABER 11 scores relies on family income, which allow parents to pay higher tuition fees (Barrientos, 2008).

Also, female (-.10) and older students (.11) get lower results on the exam. The specialized literature has consistently shown that – apart from the context effect – age has a decisive effect on academic achievement, being negative as age increases. As shown by Barrientos (2008), one additional year older implies five point less in the total SABER 11 score, and one point less in language and mathematics. With respect to gender, even if results in the national context show progress in closing the gap, there are still gender differences in average scores in favor of men. However, performance according to subject shows a progressive pattern operating in favor of women in the case of language and in mathematics.

In short, parental schooling is a stronger predictor than family's economic capital. Since the scores of the cultural capital factor are mostly influenced by the maternal educational credentials, it is justified to assert that mother's education has a greater influence on student academic performance, especially if she holds higher education credentials, which confirms a general pattern found in the national and international literature.

8.1.3 Model 3: Determinants of the Type of Higher Education Institution

Model 3 estimates the possible determination of the type of the HEI attended by social origin and secondary education variables. Once control variables are held constant (including the IMR), two factors have direct, significant, and negative effects: economic resources (-.22) and school type (-.26). On the one hand, this suggests that high-income families do not necessarily send their children to private universities; probably, their choice of HEI type is primarily not related to sector (i.e., private or public), but to quality. On the other hand, this indicates that once social origin factors are controlled, school type significantly contributes

to the likelihood of entering different types of HEI: students who have finished secondary education in first-tier schools tend to go to public, low-cost HEIs. Even though this result should be interpreted carefully, it coincides with studies on the socioeconomic profile of students at the National University of Colombia, the largest public research university in the country. For instance, Pérez, Laguado, and Martínez (2001) have noticed that 'freshmen' students enrolled in this institution have for the most part completed upper secondary education in private schools, but they do not necessarily belong to the highest socioeconomic strata. Similarly, Sarmiento, Becerra, and González (2000) found that although the applicants to this university are almost equally distributed by public/private schools, the proportion of individuals who get selected to enroll in bachelor's programs is 1:1.5 in favor of private institutions.

The fact that the public research-oriented universities select high-ability students for enrollment, who for the most part have studied in private elite schools, is not unique of the national education system. Countries such as Brazil, Chile or Mexico face similar problems. The case of Brazil is particularly interesting, where a set of quotas for students coming from public schools has been defined for entrance into some public universities.[152] Although a quota-based policy has not been established in Colombia at the national level, there are initiatives oriented to increase the participation of students from low-income households in higher education (e.g., ACCES or *Ser Pilo Paga* programs, mentioned before). Moreover, there are a few institutions that carry out affirmative action strategies, including quota definitions for particular vulnerable groups. For instance, the PAES program (*Programa de Admisiones Especiales*) from the National University establishes a quota for both indigenous and high-performing school students of poor rural regions.[153]

Additionally, the direct achievement effect in SABER 11 (.17) indicates that high performing students tend to enter HEIs with high tuition fees. This result shows that families with 'talented' children would be willing to pay for higher education on private, high-cost universities that probably offer high quality programs. The analysis should then be complemented by considering information as

152 In the framework of a methodological guide for measuring and designing indicators of social inclusion in Latin American universities, Zapata-Galindo, Cuenca, and Puga (2014) briefly describe how these quotas are measured, taking data from the *Vestibular* entry exam to the *Universidade Estadual de Campinas* as an example.

153 For a critical review of affirmative actions in Colombian higher education, see Gómez and Celis (2009).

to the quality of HEIs. Finally, regarding control variables, both sex and birth year have positive but small effects.

8.1.4 Model 4: Determinants of the Quality of Higher Education Institution

Model 4 estimates the influence of the set of independent variables on the quality of the HEI attended. As can be seen in Table 17, once controlling by sex, birth year, and IMR, all coefficients are significant, and those of SABER 11 (.36) and cultural capital (.25) are particularly strong. As expected, high performing students are more likely to enroll in high quality research universities with accredited programs, since these universities typically use SABER 11 scores as an admission criterion of student selection. Parental education also plays a key role when choosing the quality of the higher education provision for their children, probably because parents with high educational credentials are most familiar with the national education system, so that they are able to identify the best options in terms of quality. Family economic resources also have a moderate effect (.11), which indicates that parents also must be able to pay for the best quality higher education, since it is associated with high-cost private education as an alternative to the few places available in the low-cost public research universities. Also, female and older students as well as those from first-tier schools have advantages in terms of access to higher education quality, although the magnitude of these effects is small.

In sum, what counts for the *type* of HEI a student attends (Model 3), in terms of sector and cost, is the family economic capacity and the school type, whereas what counts for the HEI *quality* (Model 4) is student achievement during secondary school and parental education. Individuals' ability decisively influences the type of HEI: those who perform best in secondary school attend high-quality private HEIs.

8.1.5 Model 5: Determinants of Academic Achievement in Higher Education

Model 5 estimates the effect of all previous factors on the academic performance in higher education, based on the reading test scores of SABER PRO. Once sex, birth year, and the IMR are controlled, SABER 11 scores have a very strong impact (.30), as expected. This indicates that SABER 11 is a good predictor of

SABER PRO, at least in reading performance. This is consistent with several studies in the national context revealing that measures of generic competencies in SABER 11 are the most powerful predictors of academic achievement in higher education (for a review, see: ICFES, 2013b).The direct effects of both HEI type and quality are not strong in this model. The impact of social origin on SABER PRO works through cultural capital (.09), even though it is less than the direct influence of social origin on SABER 11. Women and younger individuals get better scores.

In general terms, although Model 5 shows tendencies which are coherent with the findings from the previous models, it is not as informative as those, judged by the R^2 of the model. This might be due to the fact that SABER PRO scores considered here are only those taken from the reading test, which reduces very much the information about student performance in higher education and, presumably, alters the predicting capacity of the model. This may also be a limitation of the characteristics of the test itself as applied to the years selected here, which made it difficult to compare average scores among individuals from different fields of study. However, beyond the technical problems when dealing with SABER PRO data in the national context, the measurement of competencies at the level of higher education has been a matter of discussion in the international literature. In this respect, Hanushek (1986, pp. 1154–1155) has pointed out:

> … Test scores might be more appropriate in the earlier grades, where the emphasis tends to be more on basic cognitive skills – reading and arithmetic – than in the later grades.… In postsecondary education, few people believe that test scores adequately measure outputs.

8.1.6 Model 6: Determinants of Income

Finally, Model 6 measures the impact of explanatory variables on graduates' income. Regarding social origin factors, parental schooling has a higher impact (.19) than parental occupations and income (.05), even controlling by all control and mediating variables. Interestingly, SABER 11 scores have a strong direct effect (.17) whereas the SABER PRO test does not have any significant impact on income, in accordance with Hanushek (1986). The factors related to higher education have also a positive effect: -.11 for institutional type and .10 for quality. This result indicates that graduates from public, high-quality universities get higher salaries. Moreover, although type and quality of higher education have some impact on student performance in standardized tests, employers appear to

select their employees more on the basis of prestige and social valorization of higher education institutions than on prior performance of individuals during their university studies.

The introduction of the graduation cohort in Model 6 aims mainly at controlling the effect of the number of years after graduation on income. As was to be expected, the most recent cohorts earn lower salaries (-.10) in comparison to those who graduated earlier, which also may be a function of work experience. Another issue of importance when analyzing labor outcomes of higher education graduates is the association between social origin, field of study, and occupational destination. In this regard, there are divergent findings in the international literature: while some studies conducted in European countries show a strong effect of field of study on graduates' income, which is very much linked to gender (Kim & Kim, 2003; Lörz, Schindler, & Walter, 2011); another group of studies has not found any link between social origin and field of study, nor between field of study and occupational status (Jackson et al., 2008) (for a comparative review, see Reimer, Noelke, & Kucel, 2008). An analysis of this kind, however, is beyond the objectives of the present work.

8.2 OLS Models with Interactions

In order to expand understanding of the relationships among the model variables, a set of statistical interactions were considered. In general terms, the presence of a significant interaction suggests that the effect of one predictor on the dependent variable varies at different values of the other predictor. If this is the case, a test can be conducted by adding an interaction term in the model in which the two predictors are multiplied:

$$\text{Dependent} = \beta 0 + \beta 1 * \text{Predictor1} + \beta 2 * \text{Predictor2} + \beta 3 * \text{Predictor1} * \text{Predictor2}$$

In the present study, the previous analysis was extended by including the interactions between social origin factors and SABER 11 scores in all six models. The objective was to explore whether ascriptive factors (i.e., both family's economic and cultural resources) operate through an interactive effect, which might contribute to IEO. A similar interaction between those factors and the student's ability (here measured by performance in upper secondary education) was also explored. The resulting parameter estimates are displayed in Table 19. Especially in the case of multi-level analyses, it is advisable to center the variables of the interaction terms before running the regressions. However, if in the present case

the continuous variables are not centered, it will not change what the model means or predicts; centering is all about making coefficients more interpretable (Williams, 2015).[154]

In a strict statistical sense, the interaction terms introduced do not add much to the previous OLS models. Nonetheless, the models with interactions deserve a closer look as they reveal some interesting elements of the underlying mechanisms here under investigation. Model 1a estimates the effects of social origin on the school type, by including the EcoR*CulR interaction. As can be seen, the main effects of the predictor variables become a bit stronger, but the interaction effects is insignificant. Model 2a offers a more interesting scenario. It estimates the effect of social origin variables and school type on the SABER 11 scores, by adding the same interaction term similar as before. As observed, the main effects of both economic and cultural resources are now reduced. The interaction between both social origin predictors is in turn positive, but now significant (.07). An interpretation of this result could be that children from wealthy households and highly-educated parents have a cumulative advantage of achieving high scores in upper secondary education (.07).

Model 3a estimates the influence of social origin and secondary education variables on the HEI type attended, by including interactions among social variables and SABER 11 scores. The size and direction of all coefficients remains the same as compared to Model 3, except for the introduction of the main effects of cultural capital (-.09). This suggests that highly-educated parents usually send their children to public universities, but if they also have high economic resources, they would rather send them to private (elite) universities (EcoR*CulR =.04). Again, the interaction effect between cultural capital and SABER 11 confirms that children coming from educated households go to public, low-cost universities, especially if they also get good school results, which allow them to succeed in the highly-selective admission procedures at these institutions.

154 It should also be noted that centering is only possible with metric variables, which is not a problem in this case as all primarily variables are metric (by means of the MCA and PCA techniques employed). Although control variables here are not continuous, they do not present any problem, as *sex* is dichotomous and *birth year* a ratio scale.

Table 19: Multiple linear regression models (OLS) with interactions

	Model 1a School type	**Model 2a** SABER 11	**Model 3a** HEI type	**Model 4a** HEI quality	**Model 5a** SABER PRO	**Model 6a** Graduate income
Independent variables						
EcoR	0.31 ***	0.06 ***	-0.23 ***	0.05 **	0.04 **	0.02
CulR	0.23 ***	0.28 ***	-0.09 **	0.09 *	0.06	0.12 **
School type		0.17 ***	-0.26 ***	0.05 ***	0.00	0.02 **
SABER 11			0.17 ***	0.36 ***	0.30 ***	0.17 ***
HEI type					0.03 ***	-0.11 ***
HEI quality					0.04 ***	0.10 ***
SABER PRO						0.01
Interactions						
EcoR * CulR	-0.01	0.07 ***	0.04 ***	0.06 ***	0.01	0.02 *
CulR * SABER 11			-0.04 ***	0.01	0.01	0.03 ***
EcoR * SABER 11			-0.01	-0.01	0.01	0.02
Control variables						
Sex	-0.02	-0.13 ***	0.02	0.01	0.04 ***	-0.05 ***
Birth year	-0.16 ***	0.11 ***	0.04 ***	-0.03 ***	0.02 ***	-0.01
Graduation cohort						-0.10 ***
Overall model fit						
Coef. F	1,084.24 ***	392.33 ***	519.34 ***	340.96 ***	155.26 ***	148.24 ***
R^2	0.29	0.15	0.25	0.17	0.10	0.11
n	15,772	15,771	15,770	15,771	15,770	15,770

Source: Own elaboration.

Notes: Standardized coefficients (Beta). Adjusted R^2 was omitted as it is identical to unadjusted R^2 in all instances.
EcoR: family's economic resources; CulR: family's cultural resources.
$^{*}p \leq 0.10$ $^{**}p \leq 0.05$ $^{***}p \leq 0.01$

Model 4a estimates the influence of social origin and secondary education variables on the quality of the higher education received. Results show that the tendencies of Model 4 did not change, although the main effects of social origin variables became smaller. The interaction effect between economic resources and cultural resources (.06) indicates another cumulative advantage: children with highly-educated, wealthy parents choose top-quality universities. Model 5a estimates the impact of all previous explanatory variables on SABER PRO scores with the interaction terms between social origin and performance in SABER 11. Results do not show any significant interaction effects. Model 6a, finally, estimates the impact of explanatory variables on graduates' income by adding interactions. There are significant, positive interaction effects between EcoR* CulR and CulR*SABER 11, although their magnitude is small.

Overall, the main effects of the first OLS analysis already revealed that social origin variables have a key role in the determination of educational outcomes and income. In the second OLS analysis, if these two ascriptive variables interact, such a determination becomes stronger. Indeed, interactions show some cumulative advantages between household's economic and cultural resources. Both combined influence student performance at secondary school, and the type and quality of higher education. Additionally, the effect of cultural capital is reinforced with the student performance in SABER 11, in the case of HEI type and income. This interaction indicates that the best-performing students with highly-qualified parents would have greater opportunities to profit from the selective public universities in the country, which in turn leads them to higher salaries as compared to graduates from other institutions.

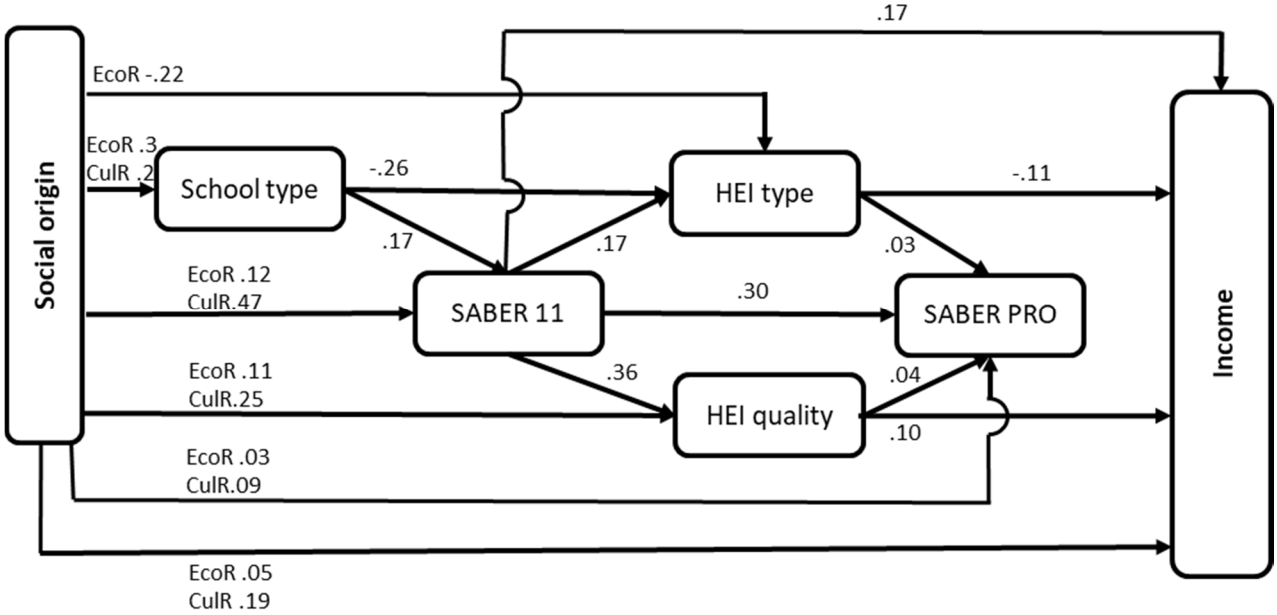
8.3 Estimation of Effects

One of the advantages of path analysis is that it makes it possible to identify and differentiate direct, indirect, and total effects, which is particularly suitable when collinearity among explanatory variables exists. This is a common characteristic in the intergenerational mobility studies (Puga & Solís, 2010), and it is the case in the present study as well. It should be noted that the term 'effects' does not imply causality, given that a truly longitudinal data set was not available here, that randomization was not feasible and that assumptions as to interventions on social origin or educational variables were purely hypothetical. Instead, the effects are interpreted here "in an essentially descriptive spirit" (Kuha

& Goldthorpe, 2010, p. 364). Hence, the estimated total effects reflect the observed associations between social origin factors and different educational and labor outcomes in a specific time, place, and population.

The significant direct effects estimated in the first OLS analysis on the basis of standardized coefficients are presented schematically in Figure 13. The statistical error associated with each one of the variables in the model (not shown in the figure) corresponds to the effect of non-considered variables. Table 20 summarizes the direct, indirect, and total effects on each dependent variable. In order to obtain the indirect effects, a set of calculations has been made, as explained in the following example. The indirect effect of cultural capital on SABER 11 scores is equivalent to the direct effect of cultural capital on school type (.20) multiplied by the direct effect of school type on SABER 11 scores (.17). In a final step, the total effect is equivalent to the sum of direct (.47) and indirect effects (.03) and, incidentally, to the simple bivariate correlation. In this example, indirect effects of cultural capital on SABER 11 scores operate through the school type, which slightly increases the total effects.

Figure 13: Path analysis model with the significant direct effects



Source: Own elaboration.
Notes: EcoR: economic resources; CulR: cultural resources.
For illustrative reasons, the direct effects of school type on HEI quality (.05) and income (.02) are not shown in the figure.

Table 20: Direct, indirect, and total effects

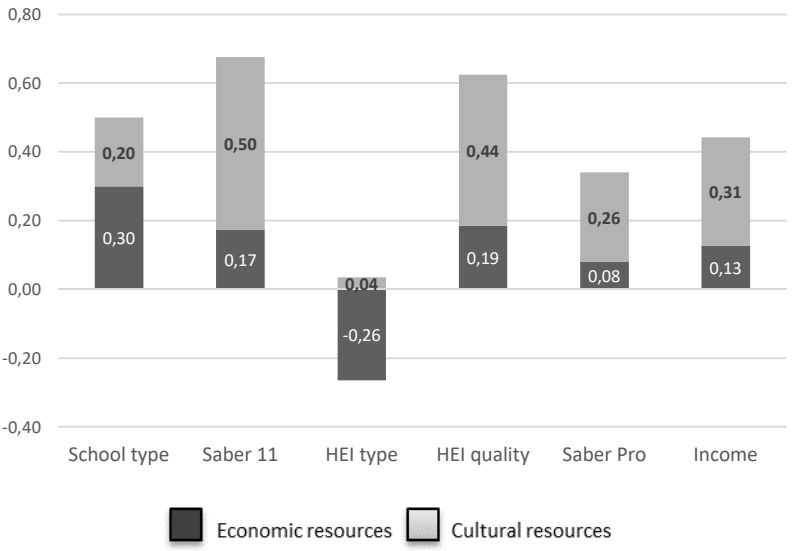
	Direct effects	Indirect effects	Total effects	Total effects of social origin*
School type				
EcoR	0.30	N/A	0.30	0.50
CulR	0.20	N/A	0.20	
SABER 11				
EcoR	0.12	0.05	0.17	0.68
CulR	0.47	0.03	0.50	
School type	0.17	N/A	0.17	
HEI type				
EcoR	-0.22	-0.05	-0.26	-0.23
CulR	0.00	0.04	0.04	
School type	-0.26	0.03	-0.23	
SABER 11	0.17	N/A	0.17	
HEI quality				
EcoR	0.11	0.08	0.19	0.62
CulR	0.25	0.19	0.44	
School type	0.05	0.06	0.11	
SABER 11	0.36	N/A	0.36	
SABER PRO				
EcoR	0.03	0.05	0.08	0.34
CulR	0.09	0.17	0.26	
School type	0.00	0.05	0.05	
SABER 11	0.30	0.02	0.32	
HEI type	0.03	N/A	0.03	
HEI quality	0.04	N/A	0.04	
Income				
EcoR	0.05	0.08	0.13	0.44
CulR	0.19	0.12	0.31	
School type	0.02	0.06	0.09	
SABER 11	0.17	0.02	0.19	
HEI type	-0.11	0.00	-0.11	
HEI quality	0.10	0.00	0.10	
SABER PRO	0.00	N/A	0.00	

Source: Own elaboration.
Note: N/A not applicable.
*Values were obtained by the arithmetic addition of the total effects of economic resources (EcoR) and cultural resources (CulR). All values are an approximation to two decimal places.

Table 20 is interesting in several ways. Overall, social origin variables have significant total effects on all outcomes analyzed. A better representation of this result is shown by Graph 14. Given that social origin here has been treated as a

two-dimensional factor, it is possible to identify the relative total effects of each dimension. On the one hand, cultural capital is the most influential explanatory variable on three out of the six dependent variables, namely: performance in upper secondary education (.50), institutional quality of higher education (.44), and graduates' income (.31). On the other, economic capital play a key role in the determination of the type of higher education institution (-.26). The table also reveals the influence of educational variables that mediate the O-D associations. In particular, student performance in secondary school has strong total effects on the quality of the university the individuals attend (.36) as well as on their academic achievement during studies at the bachelor level (.32).

Graph 14: Total effects of social origin



Source: Own elaboration.

Looking at the results in each one of the outcomes analyzed, the following findings emerge. First, social origin has strong total effects on the school type chosen by families, with a clear influence of their economic resources (.30) in the first place and their educational credentials (.20) in the second. The variation of students' SABER 11 scores is also highly determined by social background, particularly due to the direct influence of parental education. Note that part of these effects operate through the school type by slightly increasing the original direct

effects. Keeping social origin variables controlled, the significant positive total effect of school type (.17) is noteworthy.

Regarding the HEI type, the impact of household's economic resources operates directly and also indirectly through school type. In this case, cultural capital has a marginal influence on the type of HEI that students attend. The strong total effects of school type (-.23) and performance on SABER 11 (.17), once social variables are controlled, should be noted. By contrast, considering the HEI quality, the effect of social origin operates through cultural capital (.44), and its impact occurs both directly and indirectly by means of performance in secondary education. Household's economic resources have also a total effect on the HEI quality, but it is smaller than the one on the HEI type (.19). It operates indirectly through the characteristics of secondary school. Beyond the influence of social origin, the variable that best predicts the quality of the institution where individuals graduate at the higher education level is previous student achievement at school (.36). Academic (reading) performance at university is determined to a large extent by previous academic performance of the student (.32) and by parental education (.26). Any residual variance in this model is, of course, explained by exogenous variables not included here.

Finally, with respect to income, there is a strong total effect of family's cultural resources (.31), which may be associated with the availability of relevant social connections for finding a job in accordance with the schooling level. A second important factor as a determinant of income is the academic performance, especially at upper secondary education (.19). This would suggest that the development of basic competencies prior to higher education plays a key role in the future transition into the labor market. The total effects of family's economic resources on income (.13) are indirectly increased through the school type chosen. The HEI type has a direct impact, as mentioned before, if the institution is of high quality (.10) and public (-.11). This result appears to indicate that, opposite to the general belief, employers in Colombia appreciate those graduates coming from public universities *on the condition* that these have high quality programs and students have demonstrated an outstanding performance. Nevertheless, this result should not be taken as conclusive; more in depth studies are needed to confirm it.

Part IV Is Higher Education the Great Equalizer?

9 Concluding Remarks

This study has attempted to empirically analyze the degree of inequality of educational opportunities among higher education graduates by taking a highly unequal country, Colombia, as a case study. The research was guided by the main question: *To what extent and through which mechanisms does social origin determine individuals' academic achievement, the type of educational institutions they have attended, and their income in the labor market?* From a more general point of view, the study also addressed the question about the role of the national education system in reducing or reproducing inequality of opportunities among the highly educated people. In other words, it investigated whether the most educated people are 'saved' from inequality of opportunities or, to the contrary, are got by the 'long arm' of persistent social inequalities.

This final chapter is divided into five parts. The first section starts with a summary of the main results, followed by a general discussion of them in the second section. The third section identifies the contributions of the present study for the empirical research on IEO in Colombia in particular, and in other peripheral countries in general. The fourth section envisages some eventual policy implications derived from this study, even though this is not a major focus. Finally, some critical aspects for further research are proposed in the last section.

9.1 Summary of Results

Findings of the empirical analyses conducted in the present study can be summarized by the following three points. First, results suggest that social origin does have a significant impact on educational and labor outcomes of individuals, not only at the secondary but also at the higher education level, and subsequently in the transition into the world of work. In particular, they indicate that social origin operates *directly* through the household's socioeconomic conditions and the cultural capital of families. The former influence is especially strong with regard to the type of both school and university attended, and the latter plays a key role regarding the academic performance in upper secondary education, on the quality of higher education, and on income.

Secondly, social origin also operates *indirectly* on both academic and labor outcomes, through the stratification of educational trajectories. These diverted pathways are associated with both the institutional differentiation and the heterogeneous quality of educational provisions. At the level of secondary school,

results show that the indirect effects of social origin on student performance operate through the school type. At the higher education level, results reveal that family's socioeconomic conditions operate on the type of HEI through the school type, while parental education operates on both the institutional quality and student performance through achievement in secondary school. Finally, concerning labor outcomes, the cultural capital is the factor most highly associated with graduates' income. This factor operates through academic achievement in secondary school and the HEI quality.

Thirdly, social origin maintains *total effects* on individual outcomes across time. The present study shows that this occurs by means of family's cultural capital whose effects are stronger than those of economic capital in four out of the six endogenous variables in the model, namely: (i) academic achievement in upper secondary education, (ii) student performance in higher education, (iii) quality of the HEI, and (iv) income. Overall, the strong association between origin and destination suggests a scenario marked by inequality of opportunities, via the educational credentials of parents.

9.2 Discussion of Results

The statistical analyses conducted facilitate answers to the research questions posed in the present study. In the following, each question will be discussed on the basis of the theoretical framework presented in Chapter 4.

9.2.1 Individual's Choice of Institution

> *To what extent and through which mechanisms does social origin determine the type of institution attended in both upper secondary and higher education levels?*

Results show that the total effects of family background on the school type attended by children are strong (0.50), with a prevalent influence of the household's financial resources and a significant positive impact of parental education. Parents with high socioeconomic conditions are more likely to pay high-cost private schools, which offer an academic curriculum on a full-day schedule, and are predominantly B calendar (bilingual) schools. Thus, they would maximize their children's opportunities in the labor market via an academic curriculum oriented towards higher education entrance and second language training. Nevertheless, because provision of upper secondary education is vastly heterogeneous, not all

schools with those features perform well in standardized tests or other quality indicators.

Even though the country has aimed to reduce financial barriers by making public primary and secondary education largely free of cost, it seems that economic resources are not the only mechanism underlying the relationship between social origin and the choice of secondary school. Cultural capital also has an influence of substantive importance, although to a lesser extent. In contrast to wealthy low-educated families, parents with high educational credentials are well informed about the structure and functioning of the education system and can, therefore, choose for their children the best options in the wide range of institutional types of schools. Indeed, cultural capital seems to play a key role in two directions, which are two sides of the same coin: in the families' educational decisions on the one hand, and in the student admissions carried out by schools, on the other. Regarding the latter, admission processes in private schools can include interviews to parents and children, as well as student performance measured by means of prior grades or specific tests assessing a second language proficiency, among other competencies. Moreover, in some schools, other admission criteria are also important, such as social connections (e.g., personal recommendations from alumni) or a close contact of the parents with the particular affiliation of the school (e.g., belonging to a certain religious community, being familiar with the use of a specific foreign language, or having a particular international migration background, etc.).

Concerning the level of higher education, results also indicate moderate total effects of social origin on the institutional type (-.23) and strong total effects of social origin on the university quality (.62). This finding reinforces the association between family background and choice of educational institution observed earlier. In the case of institutional type, the most important mechanism is the family's socioeconomic conditions, whereas in the case of quality, the most important one is parental education. In other words, families with economic capacity send their offspring to private, high-cost universities, but if parents also have high educational credentials, they will be more guided by the quality of the higher education provision.

Overall, the 33 accredited research universities are widely recognized by their quality within Colombian society. However, the remaining numerous of universities (about 165) and university institutions are located in a wide range of different degrees of quality, which is not easy to identify, especially by those who are not familiar with the education system. Indeed, the quality accreditation status – which is pretty much linked to the level (and quality) of credentials of the

academic staff as well as to the institutional scientific production – is a factor seldom considered by individuals from low-cultural capital households. Instead, they are more prone to being attracted by the strong marketing of new private second-tier institutions looking for clients. First-generation higher education students in their families, with low levels of economic and cultural capital, are probably motivated by the promise of social mobility via access to the highest level of education regardless of the kind of higher education they receive. This could be in turn reinforced when student's performance is not particularly outstanding, and if both school teachers and parents maintain low expectancies on the individual's probabilities of success.

Concerning quality as the central criterion, high-achieving students can choose between obtaining one of the few places available in the low-cost public accredited universities or, alternatively, entering selective highly-cost private universities. Nevertheless, this decision is mainly guided by the economic capacity of families to pay for the tuition fees. In addition, this choice might also be based on aspects related to social representations around institutional reputation. In this regard, private accredited institutions are frequently valued as prestigious whereas the public ones are considered to have lost prestige. In general terms, such representations are partly based on the information publicly disseminated about strikes and social conflicts within public universities, but they might also be linked to political views, expectancies, norms, and values of certain social groups in the country. For instance, the idea about a left-wing, syndicalist point of view associated with public universities is common among some conservative circles. Indeed, some employers rather prefer to hire bachelor's degree holders from private elite universities, as explicitly indicated in job offers. Although more studies are needed to identify the rationale behind the selection criteria and practices used by employers in the country, their preference for graduates from private over public institutions may have to do with the possession of 'soft' competencies and other social class attributes.

Furthermore, results also show that the relationship between social origin and the type and quality of the higher education institutions is in turn strengthened through the school type. In this regard, a peculiar pattern at the sectorial level seems to emerge. On the one hand, a considerable fraction of high-achieving students coming from educated – yet not the wealthiest – households, who for the most part have studied in private schools, enroll in public research-oriented universities. On the other hand, public schools' students from low-income households with outstanding performance in SABER 11 – through *Ser Pilo Paga* or

other financial-aid programs – tend to choose private accredited institutions instead of the public universities. In both cases, SABER 11 plays a key role in allowing individuals to get a spot in the high-quality higher education institutions. By contrast, those low-income students attending public schools and performing poorly in the test would be diverted to low-quality private institutions, which have lower admission requirements but also demand high tuition fees.

Concerning the preferences for private over public universities of *Ser Pilo Paga* beneficiaries, some authors have hypothesized that the former institutions are perceived by those students as more prestigious and producing greater value for them (Londoño-Vélez et al., 2017). This interpretation might perhaps be associated with the assumption that private higher education is a device for upper social mobility through the acquisition of social capital. However, more in-depth analyses around the educational choices made by students should be taken into account. For instance, the qualitative component of the program's impact evaluation (DNP et al., 2016) has found that those beneficiaries going to accredited private institutions with less demanding SABER 11 scores reveal their difficulty to pass the additional admission exam at public universities, especially in high-demanded bachelor's programs, such as medicine. It was also found that there is still a fraction of students who consider public universities as the best option, not only in terms of quality or costs, but also in terms of a more favorable environment for their social adaptation. Extending these results, a following paper (Corredor, Álvarez-Rivadulla, & Maldonado-Carreño, 2019) concludes that a symbolic dimension seems to play an important role in social integration – and, therefore, in educational choice – which might be affecting persistence and graduation of students, particularly when enrolling in elite universities.

In a nutshell, findings of this study indicate that decisions about institutional type at both secondary and higher education levels play a central role in the configuration of inequality of educational opportunities, as those choices are greatly influenced by social background. Two overall mechanisms on the association between social background and educational choice have been found here: one based on economic resources and the other focused on parental schooling. Family economic resources – recognized as an important asset on educational outcomes by both economic and sociological approaches – make the educational options wider and reduce the pressure for young adults to start working early (Solís, 2012). In addition, parental schooling is central in the quality of institution attended, which may be due to the inheritance of cultural capital that promotes

cognitive abilities, provides a solid knowledge about the structure and functioning of the education system, while keeping higher expectations on children's achievement, as stated by reproduction theorists.

According to the rational action theory and following the relative risk aversion (RRA) behavior as the central mechanism, privileged students and families wield their advantages by choosing elite schools that ensure appropriate learning environments, good test scores, entrance to first-tier universities, high income, and upper occupational positions in the long term. By contrast, individuals from disadvantaged backgrounds would make less-demanding (poor-quality) educational choices, after controlling for student performance. Nevertheless, choices concerning secondary education in Colombia are mainly constrained by location (i.e., where the family lives) and privatization of provision (i.e., whether the family has the economic capital to afford private high-quality education). In the country, an 'open-choice' model would prevail, as described by Triventi, Kulic, Skopek, and Blossfeld (2016), in which student sorting is not (fully) constrained by previous academic performance and depends largely on families' decisions. As a result, school choice is distributed unequally, with highly educated, affluent parents being more likely to take advantage of this opportunity.

At the level of higher education in Colombia, even if high performers from low-income households may consider that choosing private elite universities would be a device to upward mobility, they lack the economic resources to exercise this choice. In view of that, programs such as *Ser Pilo Paga* give them the chance to choose private high-quality institutions regardless of tuition fees. This does not seem to support the predictions of the rational choice theory, at least in the case of high-achieving individuals from low-income families, since they tend to choose demanding paths in higher education institutions, once the lack of financial resources to pay tuition fees is not a constraint for them anymore. Nevertheless, RRA does serve as a mechanism to describe how low-performers make decisions differently according to social class: low-income individuals do not always distinguish the various types of institutions in higher education and end up in low-quality, less-demanding institutions. By contrast, those from advantaged households have more information and resources to choose better options, even if their performance is not outstanding.

Results of the present study suggest that the choices concerning educational institutions increase between-sector segregation, since this kind of decisions constitutes an exclusive privilege of families with economic capacity – yet enlarged by those who have also cultural capital. Importantly though, merit-based finan-

cial aid programs would broaden the opportunities of poor outperforming students, by making their educational decisions independent from social origin. Still, the analysis of educational choice and its crucial role in achievement and other outcomes requires a further scrutiny on the basis of qualitative data. A closer look at the reasons behind families' and students' preferences could shed light on additional mechanisms underlying educational decisions (e.g., choices driven by beliefs about economic returns to the various educational institutions and programs; by perceptions about their own odds of success or failure in the alternative educational paths; and/or by apprehension of downward class mobility).

In conclusion, findings indicate that *primary effects* (Boudon, 1974) of social origin on educational outcomes are largely manifested through the strong influence of cultural capital on student achievement. Concerning *secondary effects*, results suggest that the relative risk aversion mechanism seems to play a role in educational decisions in the apparent between-class variation on schooling ambitions, particularly between students from privileged socioeconomic background (regardless of their academic performance) and low-performing students from low-income families. In contrast, those individuals from underprivileged households but outstanding performance in school would choose high-demanding paths in higher education if they do not have restrictions to pay high tuition fees, by means of financial-aid programs. The latter case does not provide any support for the rational choice theory, by showing that class differences in educational choices among high-performing students are mainly due to financial constraints. Although the literature distinguishes between cultural reproduction approaches and the rational choice perspective, both could be actually be complementary (e.g., Cardona & Diewald, 2014; van de Werfhorst & Hofstede, 2007).

9.2.2 Student's Academic Achievement

> *To what extent and through which mechanisms does social origin determine the academic achievement of individuals during both upper secondary education and a bachelor's degree program?*

Results of the empirical analyses indicate that academic achievement is partly explained by exogenous variables, on the one hand, and partly explained by social origin along with institutional arrangements, on the other. Regarding the influence of family background, its total effects on student performance are strong,

measured by scores in SABER 11 (.68) and SABER PRO (.34) tests. The underlying mechanism of this association is parental education, which is particularly decisive in the student performance at secondary school. This finding supports the idea of reproduction thesis via cultural capital, which echoes previous studies – both in national and international contexts – on the greater relevance of parental education for inequality of educational opportunities, primarily the mother's credentials.

In particular, the present study provides evidence that children's educational outcomes seem to be more driven by cultural resources – which tend to correlate with parental education – than to material resources or economic capacity of families. In other words, it shows that cultural resources at home – or what *money can't buy*, following Mayer's book title (1997) – are the most important determinants of individual educational outcomes and trajectories. Results are in line with what was found by Blanco (2008) for the Mexican case: at the individual level, even though family's cultural capital has a significant effect, this is not produced directly but indirectly through other intermediate variables and their interactions. Cultural resources understood as parental education can act in the form of parenting style, stimulation of cognitive abilities, participation in cultural activities, expectancies about student performance and educational paths, modeling aspirations, among other mechanisms. Nevertheless, the exact way how cultural capital influences outcomes needs further investigation in the country. The empirical study conducted here does not allow us to come to conclusions about the particular mechanisms. For that purpose, qualitative methods would be useful.

Even though institutional type has an impact on achievement – as largely shown by the research tradition of educational effectiveness – as long as the type of institution attended by individuals is determined by their social origin, a pattern of reproduction is there. As discussed previously, structural features of the national education system, such as sector or curriculum orientation, tend to track students from different social origins into educational programs with different curricula and teaching practices, which in turn determine later individual performance.

In Bourdieu's view, the role of institutions cannot be separated from family background. In fact, the author recognized that schools have an effect in the cultural transmission, although conditional on the family cultural capital. In that sense, educational credentials – as well as academic achievement – constitute "the guaranteed product of the combined effects of cultural transmission by the family and cultural transmission by the school (the efficiency of which depends on the amount of cultural capital directly inherited from the family)" (Bourdieu,

1979, p. 23, parentheses in original). Again, more in-depth studies would be needed to empirically explore this interplay.

While compatible with reproduction theories, the evidence provided here is not enough to disentangle the relative influence of both individual and institutional aspects. An exploration of this kind, however, would require data at the institutional level – and not only at the sector level. In addition, Blanco (2009b) has suggested that addressing educational inequality needs the use of theories of intermediate scope, specifically centered on the processes of schools as organizations. The author has also questioned both the movement of effective schools and the reproduction thesis in their lack of interest towards the particular school context. Whereas the former overvalues the institutional autonomy over structural conditions, the latter assumes that what happens within the school is a function of macro-social processes, leaving unattended the particular local conditions of educational institutions. It seems that more efforts in the integration of macro, meso, and micro levels of analysis are needed for a comprehensive understanding of inequality of educational opportunities.

9.2.3 Graduate's Income

To what extent and through which mechanisms does social origin determine the graduates' income? How does educational achievement and type of institution mediate the relationship between these factors?

Looking at the determinants of graduates' income, the present study has found that social origin has a significant influence, with the parental schooling having the strongest total effects (.31), even after controlling for all intermediate variables. Regarding the role of student achievement, results show that SABER 11 scores have the second strongest effect (.19) and, counter-intuitively, the SABER PRO test does not have any impact. This is coherent with the existing evidence in the country, which suggests a positive correlation between SABER 11 and labor outcomes, net of both individual and institutional characteristics (for a review of some studies, see: Londoño-Vélez et al., 2017).

Parental schooling is of special importance for individual outcomes across all trajectories analyzed in this study, even at the transition into the labor market. In particular, family's cultural capital operates directly on individual's labor outcomes, but also indirectly through institutional stratification. As shown in the results, highly-educated (wealthy) parents usually send their children to first-tier

schools which in turn allows them to develop the competencies to perform outstandingly in standardized exams. The same is true at the level of higher education: students coming from cultivated (affluent) households are more likely to attend selective universities, which assures them high achievement, and in the long-term, high economic returns within the labor market. In short, parental schooling constitutes the strongest determinant across educational transitions and at the entry into the labor market, in favor of the reproduction theories.

The variables related to educational institutions have also a direct effect on income although of a lesser magnitude as compared to the social origin factors. For instance, a closer look at the graduates' income shows that those from both public and high-quality universities get higher salaries. Although type and quality of higher education have some impact on student performance in standardized tests, employers seem to select their employees more on the basis of prestige and social valuation of universities than on prior performance of individuals during their bachelor's studies. The fact that this study shows that graduates from public universities do not necessarily have lower earnings, in comparison to their counterparts from private institutions, means that the value-added attributed to the latter institutions is perhaps highly associated with the existing social representations around them. Again, a further exploration of perceptions of both students and employers around prestige would be interesting. Also, a more in depth analysis of income among higher education graduates by field of study and gender would be required.

The fact that institutional effects are found to be low on individuals' educational outcomes is problematic for the Educational Effectiveness Research defenders because it opens up explanations based on social reproduction principles. This study highlights a major influence of social origin, especially the cultural capital, which interacts with the segmentation of the national education system. In other words, the educational institution attended does not fully mitigate the association between origin and destination. It could be argued that schools and universities would have a positive and higher impact on the condition that educational trajectories and institutional types would not be determined by social background.

In a scenario with a rapid expansion of the education system like Colombia's, results reveal a persistence of inequalities across transitions due to both the role of social origin and its interaction with institutional arrangements in secondary and higher education. Some of the assumptions of the *Effectively Maintained Inequality* hypothesis (EMI) could be employed as potential explanations here: ex-

pansion through hierarchical differentiation might be producing greater stratification, since individuals' inequalities at the origin are combined with the stratified shape of the national education system, thus producing persistent and stronger inequalities of outcomes. As pointed out by Blanco, Solís, and Robles (2014) for the Mexican case, the institutional segmentation interacts with social stratification, thus producing unequal and divergent individuals' educational pathways. Such a segmentation occurs in the Colombian context at the level of upper secondary education by sector, curriculum orientation, school-day or calendar, which often determine the students' later transition into a certain type of higher education – if they enter at all.

Studying to get a bachelor degree at a particular university in Colombia seems to be strongly linked to the interplay between social origin and type of secondary school attended, and eventually, this will have long-lasting consequences in the individual's academic and labor market outcomes. In contrast to the paths of those graduated from selective higher education institutions, educational degrees awarded by second-tier institutions do not have the same value nor recognition in the labor market. As a result, graduates from these institutions, who often come from underprivileged social origins, end up with low-status occupational positions and earning non-competitive salaries.

The way how social stratification and institutional hierarchies interact refers to the cumulative-advantage principle regarding individual's educational and labor outcomes. If persons coming from privileged backgrounds are more likely to get access to – and graduate from – first-tier higher education institutions, which in turn facilitates their entrance to high-status occupational positions in the labor market, then the education system is reproducing inequalities and widening the gap between social groups with different levels of advantage at the origin.

A final reflection on the research on IEO is worth noting. Concerning a recurrent critique according to which this research area has been overwhelmingly oriented toward descriptions and has lacked of convincing explanations, Breen and Jonsson (2005, p. 236) remark:

> A first step toward explanation is to use our existing knowledge to produce an exhaustive list of the set of family resources and institutional factors that impinge on the opportunities of children, and to measure their relative importance in particular societies. A further step is to develop models of the mechanisms through which these associations are generated.

Similarly, Allmendinger (1989, p. 232, emphasis in original) has pointed out that "the conceptual and empirical challenge is to understand how individual and environmental factors *interactively* affect mobility processes". In this sense, this research could be extended by disentangling this interaction empirically, as well as recognizing that educational choices are significantly shaped and constrained by the opportunities offered by the education system.

9.2.4 Role of the National Education System

> *From a more general point of view, does the Colombian higher education system contribute to equalizing opportunities among individuals or does it reinforce the inequalities associated with social origin?*

By and large – with a moderate amount of simplification – the results suggest that the national education system promotes both equalization and exacerbation of inequalities associated with social origin. On the one hand, it equalizes by opening higher education institutions and programs to an unprecedented number of non-traditional students. On the other, there is, however, also a story of persisting disadvantages associated with social origin. Those coming from low social origins – especially from low parental education – are not particularly likely to follow demanding paths in selective higher education institutions.

This study has empirically shown how student attainment at some level in the structure of educational opportunities limits certain options at later stages within the education system (Kerckhoff, 1995). In secondary education, school factors (e.g., sector, curriculum orientation or location) may shape or restrict the students' subsequent paths, including whether or not they access higher education, and the types of programs and institutions they are able to attend. At the level of higher education, those dimensions are related to sector, type of institution, and quality indicators such as accreditation status, student selectivity or staff credentials.

In short, the empirical analyses conducted here confirm that the Colombian education system does not play an effective role in compensating inequality of opportunities associated with social origin. As previously argued, the institutional segmentation interacts with social stratification, thus producing unequal and divergent educational pathways (Blanco et al., 2014). Even though institutional diversity has generated a positive impact on the raise of enrollment rates in the country, particularly among non-traditional students, it has also reinforced inequality of chances as the high-quality options still remain a privilege. As a

result, as the number of higher education graduates grows, qualitative inequalities will tend to increase at the same time, especially in contexts where institutional diversity is relevant for individual's educational and occupational outcomes (Triventi, 2013).

With the hierarchical structure of the Colombian education system, higher education institutions tend towards homogenization into two main types: a first-tier composed of highly selective research universities and then several progressively lower-tier institutions. This binary scheme diverts underprivileged students from elite universities and high-quality university programs (Shavit, Arum et al., 2007). As a result, diversification could be consistent with inclusion in the Colombian case, yet the higher education system as a whole does not seem to be an equalizing force, since diversified provision is hierarchically stratified. Those from underprivileged social origin are less likely to get access to first-tier higher education. One explanation of the existence of persistent inequalities in the country despite educational expansion amounts to the fact that access to elite universities is still reduced because these expanded at a much slower pace than lower-tier institutions.

The reproductive role of the national system identified here is in line with what found in other Latin American countries concerning the strong determination of social origin on educational achievement, via either linguistic codes or intergenerational transmission of cultural capital. Fernández (2002) accepts, however, that the magnitude of this determination is smaller than the one expected by reproduction theory's proponents.

Even though the present investigation does not completely disentangle all mechanisms at work, the findings lead to think about of IEO as a complex process. They indicate a pattern of reproduction, which can occur through different mechanisms, according to the level of analysis: socioeconomic disadvantages at the origin, individual decisions of distinction, or institutional arrangements of the education system that perpetuate initial inequalities. Accordingly, it is plausible to assume that reproduction of inequalities implies more complex processes that require further theoretical refinements. An example of some of those intricacies is given in the following paragraph by Duru-Bellat (2015, p. 325):

> Social inequality in education is universally observed in countries in which children are brought up in unequal families; they enter school with unequal linguistic, cognitive, and cultural assets and attain unequal levels of achievement. Moreover, they make unequal choices, leading to unequal levels of education and social reproduction. However, the latter varies across countries, demonstrating that the way school itself is organized matters. The timing of the selection process and the degree of segregation within the system are especially important, along with the

student social mix they generate. As countries implement policies to fight educational inequality, simply expanding education does not prove efficient since it only delays social selection. More qualitative policies then seem necessary, such as limiting early inequalities and focusing on disadvantaged families, which in turn requires broader social policies.

In their book *Separate and Unequal,*[155] García, Espinosa, Jiménez, and Parra (2013) argue that the Colombian education system is socially segregated and unequal. Nevertheless they point out that both extreme perspectives around IEO (i.e., equalization vs. persistence of inequalities) are partly false and partly true, as the conditions in which inequalities are produced, reproduced and eventually overcome, depend on the particular context and historical moment. Trends of equalization or reproduction can vary according to country, region within the country, but also time period. This is why empirical studies are required to measure IEO in those specific conditions. In conclusion, for the cohorts and period time analyzed in the target population, the present study could conclude that inequality of educational opportunity persists in the Colombian society, although this "would be even more unequal without schools" (Hout, 2012, p. 395).

9.3 Contributions to the Empirical Research on IEO

This section summarizes some contributions of the present book to the empirical research on IEO in the particular context of Colombian higher education. Apart from being a replicated diagnosis of educational inequalities in the national context, this study extends prior research in the country in several ways, by providing: (i) a comprehensive approach to the topic of IEO by combining the theoretical discussion with empirical evidence; (ii) an integration of several research traditions; (iii) a special focus on the mechanisms that link social origin and individual's educational and occupational outcomes; (iv) an analysis of the individuals' trajectories along different points in time across their transit through the education system and the entrance into the world of work; (v) an emphasis on educational stratification at the level of higher education; and (vi) an examination of horizontal inequalities manifested in the stratified institutional paths among

155 The title is clearly a modified version of the famous doctrine named *Separate but Equal* introduced by the Supreme Court of the United States in the framework of the Plessy vs. Ferguson case in 1896 (Legal Information Institute, 2018). Since the 1950s, the Supreme Court started to overturn this doctrine of racial segregation towards African-Americans.

higher education degree holders, which in turn may influence their consequent outcomes.

Combination of Theory and Empirical Evidence

National literature on educational inequalities has often divided social scientists into two opposing extremes: those of theorists and empiricists. Presumably, two main reasons could explain this: data restrictions and disciplinary orientations. As the existing limitations on data are concerned, most studies were unable to make any methodological innovations. Rather, conceptual discussions without empirical support were more common. Conversely, the recent availability and improvement of data sets have generated a growing emphasis on sophistication of statistical techniques to the detriment of theoretical elaborations.

Regarding disciplinary issues, a high proportion of social scientists has ignored and even avoided working on data to support their assumptions. In particular, due to the great reception that the social reproduction theory has experienced within certain circles in Latin American countries (Fernández, 2004) – not only among groups of sociologists but also among some teachers and staff organized in unions – the idea that schools can modify the relationship between social class and achievement was conceived as an 'imperialist' idea, simply for ideological reasons. As a result, much of the academic production from this perspective has lacked any empirical basis. Moreover, in some circles, quantitative studies are seen as oriented towards findings that are supportive of neoliberal policies. Nevertheless, as pointed out by Caruso (2010a), quantitative works do not necessarily mean support to those policies; on the contrary, this kind of research can also provide empirical evidence of the existence of persistent inequalities which eventually support the 'pessimistic' thesis of social reproduction:

> Highly popular simplifications about quantitative research as being solely the long arm of neoliberal tendencies are sharply challenged by many of these contributions. After all, solid quantitative research has also set forth pertinent evidence about the limited benefits, if any, of privatization, vouchers, and charter schools (Caruso, 2010a, p. 442).

Indeed, quantitative analyses of large-scale data within the research tradition on factors associated with learning have been very useful in rendering rigorous empirical descriptions of regularities around the topic of educational inequalities. Efforts to find statistical effects in the ICFES investigations are a necessary step for making policy recommendations based on evidence. However, a theoretical

elaboration is also needed, as a basis for the specification of those regularities and patterns of IEO. Besides, with further empirical research and subsequent testing, the explanatory potential of different theoretical frameworks can be assessed.

Consequently, this research area requires more empirical evidence combined with theory-driven debates from complementary approaches of various disciplines. Theory development accompanied by robust empirical evidence will not only enrich the advancement of knowledge on the causes and consequences of educational inequalities, but it could also establish solid grounds for successful policy programs. The mere use of sophisticated statistical procedures does not guarantee the quality of research, if it is not accompanied by a robust theoretical background.

Despite the progress in the national research showing the many facets of educational stratification, empirical studies are still incipient and face several challenges. With the consolidation of high-quality data bases and information systems over the past few years, national educational research can be strengthened and provide relevant findings with more accurate measures, likely to contribute to the current study of IEO as well as to enrich comparative studies at both regional and global levels. The present research is at the intersection between the treatment of large data sets and the conceptual discussions on IEO. In this sense, this book is intended to be complementary to those national studies in sociology and other disciplines that are mostly based on qualitative methods, as well as those strictly empirical studies that are predominantly atheoretical.

Integration of Research Traditions

Each one of the four research traditions outlined in Part II of this book is linked at various degrees and different ways to the fundamental concern of IEO. None of these bodies of research alone provides a comprehensive perspective for the research questions proposed here. Besides, they differ widely: they come from different disciplinary domains; they are dissimilar in their epistemological approaches and basic assumptions; they exhibit diverse levels of analysis; they are based on theories with various degrees of development; and, finally, some have produced more empirical evidence than others. Therefore, much more scholarly integration is required within the study of IEO.

In particular, the present study integrates two research traditions that often address educational inequalities separately: *achievement studies* (Coleman et al., 1966) and *intergenerational mobility studies* (Blau & Duncan, 1967). The classic

work of Jencks and his colleagues (1972) is known to be the first effort to synthesize the main findings of both traditions (Ramirez, 2006), which still tend to remain as two separate and independent domains. Additionally, this study also incorporates relevant developments of the Educational Effectiveness Research as well as some discussing topics from the field of Higher Education Research.

As far as EER is concerned, although it does not address directly the topic of IEO or the question of its mechanisms, it has helped to destroy the myth about the prevalence of family background on students' outcomes and the impossibility for schools to modify them (Reynolds, 1995). Empirical advances in EER may enrich or even challenge the assumptions of theoretical approaches considering persistent inequalities, and, conversely, the theoretical elements of other approaches can strengthen empirical research on EER (Blanco, 2009b). Also, issues developed within the higher education research field may be a valuable contribution for the study of IEO, as for example: debates on inclusion, institutional structures, staff and student composition, admission processes, assessment criteria, relevant knowledge for learning society, etc. The analysis of these aspects can be expected to complement the extent to which educational institutions might shape, transmit or modify the effects of ascribed characteristics on individuals' educational decisions, learning opportunities, and occupational trajectories.

This book is an attempt to build upon different research traditions that often seem to be disconnected or contradictory, and to provide a comprehensive conceptual framework for interpreting the present findings towards a better understanding of the IEO phenomenon.

A Focus on the Mechanisms

While much is currently known about levels, patterns, and trends of educational inequality, the perspective of opportunities – i.e., to what extent and through which mechanisms a family's socioeconomic background affects children's (educational) outcomes? – is a more challenging question (Torche, 2013) that allows researchers to introduce mechanism-based explanations. This perspective constitutes an important generative process in the development of theory and empirical research on educational inequalities, but also in the design of educational policies.

One way of identifying the mechanisms that underlie the impact of origin on destination is assessing different measures of social origin. On this matter, Solís (2012) proposes to conduct comprehensive analyses on the possible effects of

different dimensions of inequality – such as social class, parental education, economic wealth, among others – on specific events of the life course. As measures of social origin, the Colombian literature has usually studied the family socioeconomic characteristics, in terms of income or household living conditions. Studies in the country also have confirmed that parental education has a stronger correlation with adult children's outcomes than just socioeconomic measures. Apart from qualifications of parents, other cultural resources at home have also been considered by national researchers. By contrast, parental occupation has rarely been taken as an independent variable, which perhaps has to do with the predominance of the economic perspective in educational research in the country. Progressively, other ascribed factors, such as gender or race, have also started to be considered. Nevertheless, more empirical analyses are required to disclose the mechanisms at work within the phenomenon of IEO and, most importantly, to determine their relative weight (Erikson & Jonsson, 1996b). The present study contributes to this direction by analyzing the relative importance of both socioeconomic background and parental education in individuals' outcomes.

Another way to look at the mechanisms is by examining the mediating role of education in the Origin-Destination determination. This is central to the current state of research as it allows developing more sophisticated theoretical approaches which include other factors in the analysis, such as the institutional arrangements of the national education system that may play a role in educational transitions and choices across the life course. In Colombian research, the question of both the determinants and consequences of individuals' outcomes deserves more empirical analysis regarding the influence of education as a key mediating variable. It appears that only a few studies in the country have addressed the Origin-Education-Destination relationship, by considering educational variables – including both academic achievement and quality-related institutional diversity – as mediators in the analysis of the final individual's outcomes. This work seeks to address this relationship with large official data sets. A previous similar effort is well represented by the works of Psacharopoulos and Vélez (1993) and Vélez (1990) referring to the city of Bogotá. More recently, value-added studies have provided relevant findings on the extent to which some features of educational institutions contribute to overcoming the socioeconomic gaps in achievement and other outcomes.

While evidence from the present study shows a clear association between parental education and children's both educational and occupational outcomes, there are still questions about the mechanisms involved. In particular: to what degree parents' schooling is the driver or to what degree concomitant factors,

such as parents' expectations, guidance, and modelling of academic skills, possession of books and other scholarly materials at home are essential? Whether cultural differences expressed in manners, styles, taste, and the like are consequential of educational success in Colombia, is a question that needs more empirical evidence, as it has been exhaustively studied in industrialized nations. In the absence of data about cultural resources, it is not possible to advance more detailed interpretations here. It would be perhaps more accurate to interpret the positive effects of parents' level of education on individual outcomes as operating through: (i) strategic knowledge about the education system, and (ii) the anticipation of more qualified training of skills to improve academic achievement (Erikson & Jonsson, 1996b).

Individual Trajectories

Many empirical studies have explored the magnitude of inequalities in a single educational outcome, such as access, completion or academic achievement at a certain level of education. A smaller number has focused on educational inequalities across trajectories. Family background variables may affect the probability of making certain transitions, but also of the duration of those transitions or the segmentation of paths. Regarding the diverted trajectories, a group of studies have analyzed the effects of social origin in reaching a particular location in the stratified curriculum or attending a particular institution (e.g., Lucas, 2001). In general terms, analyzing educational trajectories offers a relevant approach for the study of educational inequalities as they arise or become amplified at transition points.

Largely due to the lack of longitudinal data, literature on IEO in Colombia using information about trajectories of individuals is scarce. A high proportion of national studies analyzes educational inequalities on the basis of information gathered at one point in time, which has a limited scope. This study is innovative in the design of a large data set resulting from merging three national administrative databases. The information gathered allowed the reconstruction of educational and occupational trajectories of the same individual at three points in time: completion of secondary school, performance during university studies, and employment after graduation.

Stratification in Higher Education

As stated by Ramirez (2006, p. 443) about comparative education, "there is a tendency to choose sides and identify oneself as a researcher in higher education or as one focused on lower levels of schooling". Such a division, which is found in educational research in general, also applies to two empirical traditions in sociology of education. Although inherently linked, these traditions are not effectively integrated: whereas researchers interested in social mobility examine more often – yet not exclusively – the level of higher education, those scholars focused on the determinants of academic achievement or educational decisions/transitions have mainly analyzed lower levels of schooling.

Sociological research on educational stratification has a long tradition of studying inequalities at the level of secondary education, a topic that has acquired new relevance with the PISA results (Blossfeld et al., 2016). However similar research at the level of higher education has mainly concentrated on outcomes such as graduation or income. As a result, and also due to a lack of data collection, studies on achievement at the higher education level are less often conducted. The present book tackles the topic of IEO in the population of university graduates, including information on academic achievement in higher education, which is seldom found in studies of this kind, mainly due to the scarcity of standardized student assessment in higher education.

Horizontal Inequalities

Another manifestation of IEO is in the form of horizontal differences at the same level of education. In contrast to vertical inequalities, in terms of differences in the quantity of education obtained among social groups (e.g., schooling years or the highest level of education attained), horizontal inequalities (Ayalon & Shavit, 2004; Gerber & Cheung, 2008; Lucas, 2001; Torche, 2005) are also important to examine in contexts where national education systems are highly diversified.

Although the study of horizontal inequalities is not really new, there is still a lack of data on countries outside Europe and North America: "With more data from a wider range of countries, theories about how national institutional arrangements might be related to horizontal stratification in higher education might be developed and tested" (Gerber & Cheung, 2008, p. 313). In Colombia, some works have already found that certain indicators of educational quality have an effect on occupational attainment, such as the SABER 11 score in secondary ed-

ucation and the university's prestige (Psacharopoulos & Vélez, 1993). More recently, Gaviria and Barrientos (2001c) have concluded that the type and quality of secondary education has a strong impact on the likelihood of entering higher education, but also on later academic achievement and occupational outcomes. However, more studies of this kind on educational stratification are needed in the national context.

Within the population of higher education graduates, this work has identified consequential effects of social origin on educational decisions concerning qualitative types of institutions, even where quantitative differences are virtually nil. Since all individuals in the target group have the same level of formal credentials, the study explored how social disparities are expressed in the divergent individual's trajectories in terms of the type and quality of the different educational institutions chosen. Results show that family's cultural resources have an impact on the quality-related characteristics of the institutions students have chosen – or are allocated to – in both secondary school and university. In addition, the study also analyzed the relative effect of the type of educational institution attended in the subsequent educational outcomes achieved by individuals, once social origin is controlled.

Aside from economic circumstances that have been studied more frequently, it is of particular importance to examine the effects of the institutional setup of education systems on inequalities. In this context, two characteristics of educational institutions are relevant: diversification due to quality issues and public/private sector. In light of the present findings, although growing enrollment is associated with expansion through diversification, the shape of Colombian higher education system does promote inclusion, but not equalization in terms of the educational quality received.

9.4 Some Policy Implications

Studies like this are fruitful not only in terms of the diagnosis of educational inequalities but also in the identification of promising strategies to overcome or mitigate them. Even though making policy recommendations was not an objective of the present investigation, some general policy reflections can be derived from the findings. The fact that high-quality educational opportunities are not available for all individuals regardless of their social position of origin deserves a reflection with public policy implications.

Although this study has focused on university graduates, results suggest that having access to a high quality education at the secondary level is of special importance for later individual's outcomes. The point at the end of upper secondary school seems to be a decisive step for later achievement in the university and future labor career. As shown here, performance in the standardized test at the end of secondary education has a strong effect on entering a type of higher education institution, obtaining good scores during university studies, and earning a better salary. In this sense, universalization of access in higher education will not have any impact on equality of opportunities, as long as the education system does not influence positively those factors that determine student performance at secondary education (Correa, 2011). On the contrary, the system will continue to divert students from advantaged cultural and economic backgrounds to the best quality options in higher education.

Therefore, primary and secondary education, where students develop basic competencies, could break the link between origin and destination, by guaranteeing quality and free education for all. In particular, this study has shown that those characteristics related to quality in upper secondary schools are: full-day, academic, and bilingual curricula. To this respect, Sánchez, Quirós, Reverón, and Rodríguez (2002) have stressed that improving the quality of primary and secondary education offered to the poorest segments of the population is an imperative task for the country in order to improve conditions of social equity in access to – and graduation from – higher education. In addition, the authors have suggested that universities also need to apply strategies to assure retention and high performance among disadvantaged students, which implies the joint participation of different stakeholders, not only public universities.

Policy strategies such as *Ser Pilo Paga* program have been oriented to expand access to higher education among the students from low-income households with outstanding academic performance. Nevertheless, the program does not address the existence of horizontal inequalities at secondary school, in particular, and that the national education system is socially segregated, in general. As a consequence, the program has had a positive impact on two ways: an overall increase of SABER 11 scores among students from the lowest socioeconomic levels, and a transformation of private accredited institutions becoming more selective and more diverse in their social composition of students. By contrast, public universities face numerous difficulties in limited resources and poor infrastructure, despite expanding admission capacity. This raises questions about the effectiveness of demand-driven policy strategies towards inclusion without strengthening the public supply at both secondary and higher education. As stated by Orozco

(2011) for the Colombian case, policies focused on increasing enrollment regardless of quality of provision will only enlarge the socioeconomic gap among social groups in higher education.

Beyond addressing policies towards educational segmentation by sector and quality, if direct effects of social origin are decisive on individual destinations, then factors underlying these effects (e.g., differences in living conditions, cultural resources at home or social networks) should also be taken into account in policy issues (Kuha & Goldthorpe, 2010). The evidence provided here shows that parental education matters in individual's trajectories and destinations. In other words, a scholarly culture close to the children is vastly important for their educational outcomes. In a speculative way, it could be claimed that providing tools and elements through cultural activities, fostering books reading, building public libraries, etc. would help developing a scholarly culture in the family and, consequently, children would do better at school. Furthermore, as these results echo previous findings emphasizing the mother's role in academic achievement, the fact that the female participation in schooling is greater at the national level deserves special attention. An idea in this regard was exposed by Tenjo and Bernal (2004) in the beginning of the present century, who have suggested that increasing educational attainment among women would be more productive, in terms of academic achievement, since the mother's schooling has a stronger impact on children's outcomes.

However, a common assumption is that "interventions in the schools are generally viewed as both more acceptable and more likely to succeed than, say, direct interventions in the family" (Hanushek & Wößmann, 2007, p. 5). This is a widespread idea among international agencies and government organizations working in educational policy, as exemplified in the following paragraph (OECD, 2004, p. 186):

> Many of the factors of socio-economic disadvantage are not directly amenable to education policy, at least not in the short term. For example, the educational attainment of parents can only gradually improve, and average family wealth depends on the long-term economic development of a country as well as on the development of a culture which promotes individual savings. The importance of socio-economic disadvantage, and the realisation that aspects of such disadvantage only change over extended periods of time, give rise to a vital question for policy makers: what can schools and school policies do to raise performance and promote equity?.

An opposing claim is expressed by Ramirez (2006) following the original argument of Jencks et al. (1972): "to reduce inequality one should focus on the fiscal

policies of the state and their leverage on inequality, instead of tinkering with educational reforms as a means to this end" (p. 438). It seems that in the Latin American context, educational policy is necessary but not enough: educational policy per se does not replace other policies on social, economic, and labor issues. Hence, educational policies should be complemented by other social policies in order to reduce social inequalities (Fernández & Blanco, 2004).

9.5 Limitations and Recommendations for Further Research

Of course, both the conceptual approach and the empirical analysis of the present study are not free from limitations. This section concludes by suggesting some areas that can be extended in further work, including aspects related to: data restrictions, sample issues, construction of social origin variables, statistical model employed, and extension of results according to field of studies in higher education, and a regional perspective among others.

Data Restrictions

When addressing research questions about educational trajectories, one of the most frequent limitations in developing countries is related to gathering relevant data and information on the same individual at different points in time. Despite technical restrictions of the data sets used here, they provide relevant information on the individuals' trajectories and outcomes. Still, there are some interesting open questions that the study could not address given the information available. While writing this book, there have been promising improvements of the ICFES and MEN databases, which include a great deal of information about students, teachers, graduates, and institutions. Even if they are still far from being panel or longitudinal data, they offer high quality material to enrich and further develop research on educational topics in the country. Nowadays, educational research in Colombia is progressively using quantitative data. Great improvements in this kind of studies might also be possible by the use of better qualitative and quantitative data that would measure unobserved variables. Thus, aspects such as norms, values, aspirations of students and their families, which are relevant to comprehensively understand choices, could also be assessed. It would also be extremely interesting to include institution-level variables, such as teacher practices, curriculum or peer effects, which have been shown to play an important role in academic performance.

Sampling

Another limitation deals with the size and selection of a sample. It is hard to extrapolate conclusions from this study to the overall population of university graduates in the country with a known prediction of error-likelihood. This is mainly due to the fact that a probability sample is not possible to construct from the data. This problem is, however, inherent to the information available.

A possible critique could point out that the target population of the study is composed by a highly selective group of students, thus excluding the group of young people who leave the school system prematurely. In that sense, the analysis conducted is limited to this population and does not capture the full configuration of IEO in the national context. However, a direct consequence of this is likely to be an underestimation of the impact of social origin, which in turn, however, would confirm the trends found. Indeed, it would make stronger the impact of social background's variables on individual outcomes.

Unobserved heterogeneity would be better controlled by the use of high-quality data sets and statistical tools to account for it. Overall, improvements in the data set as well as the introduction of more sophisticated statistical techniques are worth conducting. However, the final purpose of this investigation was mainly to determine whether the problem under investigation (i.e., IEO in the transition from upper secondary to higher education), grounded in the current state of sociological knowledge, has sufficient promise to justify deeper investigation. The baseline established by this study should be probed with further detailed analysis, using a variety of strategies for controlling unobserved heterogeneity, and thus to determine the sensitivity of results to different social groups, cohorts, and regions across the country. In this sense, this book represents a major contribution despite a lack of national studies from this perspective.

Another point is related to the birth and age cohorts. Regarding the former, this research should perhaps have taken into account the particular historical context into which the sample of graduates analyzed was embedded and how that context might eventually have also an impact on individual outcomes. With respect to the age cohort, the study could be complemented by examining the impact of social origin through a comparison between younger and older individuals. Whether the effect of family background tends to decline with age or not could be also tested. Thus, the present study should not be taken as conclusive.

Measure of Social Origin

Although a particular contribution of this book is the distinction between parental (economic or cultural) resources as explanatory mechanisms of IEO, another limitation refers that a more complete construction of the social origin variables would be more informative. This would be possible, for instance, by including additional relevant variables such as: family composition and structure, housing conditions at the time students were at secondary school, a historical record of family income, unobserved variables such as parents' expectations, as well as measures of parental occupations. Concerning the latter, to my knowledge, national studies on IEO including data on occupational status of both parents and children are rare. This shortcoming may have to do with the fact that the information contained in the national official records on education (e.g., ICFES and MEN databases) does not allow constructing rigorous measures of family occupational status or social class, which in turn makes it difficult to advance the research of social mobility from a sociological perspective.

Moreover, some topics have been only marginally treated or even completely ignored in the present study. This is the case, for instance, of the gender gap or racial/ethnic segregation. The sensitivity of results to different ascribed characteristics beyond social origins could help to have a more complete view of the phenomenon of IEO in the Colombian context.

Statistical Model

It is still poorly investigated how individual factors (e.g., social origin) interact with institutional factors, thus producing IEO. A possible extension of this study could be the incorporation of multilevel models with two levels of analysis (i.e., students nested within educational institutions) or even three levels, by also introducing the geographical location of the institutions, for example. With these estimates, additional research questions can be answered. In any case, it would be expected that if school effects could be better controlled through these models, the tendency of the impact of social origin variables, especially the cultural capital, would remain high. In that case, the conclusions of this work would remain valid. Conversely, another possible result with the use of hierarchical linear models might be that the students' sociocultural composition of schools might have a stronger effect than individual variables of social origin. In that case, the existence of causal effects at the macro level that have an aggregate impact on the micro level could be hypothesized. In the latter case, more optimistic conclusions

on the role of the national education system could be formulated: as opposed to family's economic and cultural capital, the school composition could be subject to control through actions taken inside the education system, such as policies towards selection, allocation, and admission of students from different sociocultural groups under principles of integration and inclusion.

Causality

According to Torche (2015), virtually all putative mediators in path-analytic models are endogenous and provide limited information about mechanisms for transmission in the O-D relationship. According to the author, only accounting for all potential factors influencing this relationship, it is possible to rule out endogeneity, and in turn get causal connections – an exhaustive measurement that seems unrealistic. A common response among scholars is that "even if no causal effects can be captured, mobility models including mediators are valuable descriptive devices that help researchers assess the different pathways for the transmission of advantage" (Torche, 2015, pp. 358–359). Nevertheless she still argues that descriptive models might yield to estimates of different size and magnitude in comparison to those of causal estimates.

It is to be noted that the model used in this work does not intend to be a causal analysis. For that purpose, dependent variables should be manipulated by means of an experimental design.[156] Instead, the empirical exercise conducted here proposes a simple model of associational analysis, which is less prone to causal interpretations. Such a model makes possible a careful examination of associational interpretations of IEO, with a special emphasis on the role of the type and quality of educational institutions in mediating the O-D relationship, through a decomposition into direct and indirect effects among the factors considered. Results regarding IEO should be interpreted cautiously, though.

Generalization of Results

An eventual extension of a research of this kind with Colombian data could adjust for the effect of geographical location. This would encourage obtaining contextualized information on school performance in a specific local space, with

156 Under controlled conditions, non-experimental research exercises can also be conducted when performing causal analyses. For a discussion of this and related matters, see Ato and Vallejo (2011).

particular social, political, and economic characteristics. This way, the topic of educational decisions could be better analyzed, by controlling whether those decisions are determined by geographical restrictions – as in most cases parents have limited options to make school choices – rather than free choices. Since educational choices about the type of institution are not only determined by social origin or student performance, but are also constrained or facilitated by the institutional arrangements available in the place where individuals live, geographic location and the urban/rural distinction are key factors on the configuration of inequality of opportunities. This factor alone already generates inequalities in the socioeconomic composition of the student body (Blanco et al., 2014). Not taking this factor into account in the present analysis may have led to conclusions that only partially reflect the national reality: "the choice of studying in certain institutions is not a real choice but a conditioned one, that usually depends on the cultural and social capital of the students and their socio-economic position" (Guzmán-Valenzuela, 2016, p. 10).

An additional issue that would enrich the study is a differentiated analysis of the impact of field of study on the related income. Differences in salary related to knowledge domain but also according to region are crucial. Substantial variations in the rate of income may depend on the geographical region concerned and on the time when the survey was conducted. Abundant empirical evidence has showed the systematic differences in returns to education associated with the individual's place of residence. Further research should control for this variable in order to eliminate relative supply or demand effects that raise or lower income in different regions of the country. Also, future analysis should include different cohorts that could be exposed to various contextual and historical factors that might have an effect on returns to education.

Another limitation of the data set has to do with the impossibility to know the income of independent workers. This may have an influence on the underestimation of direct effects of socioeconomic background on income. Extending the model to all kinds of workers (i.e., including those independent in the formal and informal labor market) with appropriate data would also have the advantage of controlling for unobserved heterogeneities. Also, it would be fruitful to further analyze not only income but also other occupational outcomes, such as labor conditions or economic activity in relation to field of study.

As for variables of educational outcomes, further improvements could include to investigate the effect on alternative dimensions, variations of the standardized test analyzed and the eventual changes over time, related to exogenous

factors, such as implementation of policies or the occurrence of sociodemographic phenomena and historical events.

Particularly, further research is encouraged to apply Boudon's model of primary and secondary effects with ICFES and SPADIES data in the transition from secondary to higher education. Thus, it would be possible to assess the impact of social origin on educational choices regarding different institutional paths in higher education, conditional of academic achievement (SABER 11). For that purpose, it would be required to gather more and better data on individuals' beliefs and expectations about their past and future choices, their alternative paths, as well as student performance in previous transitions (e.g., lower secondary education).

There are many important issues on which the present book has little to say, and even more issues where what has been written is partial, incomplete or just exploratory. In any case, this study provides novel empirical evidence, which, despite its limited scope, offers some solid basis for substantial theoretical reflections on the phenomenon of IEO in general, and on its expression at the level of higher education in Colombia, in particular. Clearly, an agenda for the study on IEO from a sociological perspective in the national context with the integration of data sets from the existing information education systems is a priority. Therefore, this work should be read as an attempt towards a more ambitious and continuous program of research in this direction that is clearly in need of future extension.

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List of Acronyms and Abbreviations

ACCES	*Acceso con Calidad a la Educación Superior* [Access to Higher Education with Quality]
CASMIN	Comparative Analysis of Social Mobility in Industrial Nations
CC	Cultural capital
CERES	*Centros Regionales de Educación Superior* [Regional Centers of Higher Education]
CIA	Central Intelligence Agency (United States of America)
CIVED	Civic Education Study
COP	Colombian Pesos (currency)
CRC	*Congreso de la República de Colombia* [Congress of the Republic of Colombia]
CulR	Family's cultural resources
DANE	*Departamento Administrativo Nacional de Estadística* [National Administrative Department of Statistics]
DNP	*Departamento Nacional de Planeación* [National Planning Department]
ECAES	*Examen de Estado de Calidad de la Educación Superior* [State Examination of Higher Education Quality]
EcoR	Family's economic resources
E-D	Education-Destination relationship
EER	Educational Effectiveness Research
EMI	Effectively Maintained Inequality hypothesis
ENCV	*Encuesta Nacional de Calidad de Vida* [Survey of Life Quality]
FAL	Research on Factors Associated with Learning
GDP	Gross Domestic Product
HEI	Higher education institution
HEIs	Higher education institutions
HLM	Multilevel (hierarchical) linear models
IALS	International Adult Literacy Survey
ICCS	International Civic and Citizenship Education Study
ICFES	*Instituto Colombiano para la Evaluación de la Educación* [Colombian Institute for the Assessment of Education]
IEO	Inequality of educational opportunities
IESALC	*Instituto Internacional para la Educación Superior en América Latina y el Caribe* (UNESCO) [International Institute for Higher Education in Latin America and the Caribbean]
ILO	International Labor Office (UNESCO)
IMR	Inverse Mills Ratio
ISCE	*Índice Sintético de la Calidad Educativa* [Synthetic Index of Educational Quality]

ISCED	International Standard Classification of Education (UNESCO)
ISCO	International Standard Classification of Occupations
ISEI	International Socio-Economic Index of Occupational Status
ISIC	International Standard Industrial Classification of All Economic Activities
JCA	Joint Correspondence Analysis
LLECE	*Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación* [Latin American Laboratory for the Assessment of Educational Quality]
MCA	Multiple Correspondence Analysis
MEN	*Ministerio de Educación Nacional* [Ministry of National Education]
MIDE	*Modelo de Indicadores del Desempeño de la Educación* [Model of Higher Education Performance Indicators]
MMI	Maximally Maintained Inequality hypothesis
NDP	National Development Plan
NGO	Non-governmental organization
O-E	Origin-Education relationship
OECD	Organisation for Economic Co-operation and Development
O-E-D	Origin-Education-Destination triangle
OLE	*Observatorio Laboral para la Educación* [Labor Observatory for Education]
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PERCE	*Primer Estudio Regional Comparativo y Explicativo* [First Comparative and Explanatory Regional Study]
PIAAC	Program for the International Assessment of Adult Competencies
PIRLS	Progress in International Reading Literacy Study
PISA	Program for International Student Assessment
PPP	Purchasing Power Parity
SABER 11	*Examen de Estado de la Educación Media* [Upper Secondary Education State Examination]
SABER PRO	*Exámenes de Calidad de la Educación Superior* [Examinations of Higher Education Quality]
SACES	*Sistema de Aseguramiento de la Calidad en Educación Superior* [Higher Education Quality Assurance System]
SEM	Structural Equation Modeling
SENA	*Servicio Nacional de Aprendizaje* [National Training Service]
SERCE	*Segundo Estudio Regional Comparativo y Explicativo* [Second Comparative and Explanatory Regional Study]

SMMLV	*Salarios Mínimos Mensuales Legales Vigentes*- [Monthly Minimum Wage]	USD	United States Dollar (currency)
SNET	*Sistema Nacional de Educación Terciaria* [National System of Tertiary Education]		
SNIES	*Sistema Nacional de Información de la Educación Superior* [National Higher Education Information System]		
SPADIES	*Sistema para la Prevención de la Deserción de la Educación Superior* [System for the Prevention and Analysis of Higher Education Dropout]		
STEM	Science, Technology, Engineering, and Mathematics disciplines		
TERCE	*Tercer Estudio Regional Comparativo y Explicativo* [Third Comparative and Explanatory Regional Study]		
TIMMS	International Association for the Evaluation of Educational Achievement's Trends in International Mathematics and Science Study		
T&T	Technical and Technological Education		
TVET	Technical and Vocational Education and Training		
UIS	UNESCO Institute for Statistics		
UNDP	United Nations Development Programme		
UNESCO	United Nations Educational, Scientific and Cultural Organization		

Annexes

Annex A: Description of the National Standardized Tests: SABER 11 and SABER PRO

SABER 11	
What is it?	It is a standardized state examination that assesses individual competencies of final-year school students. Scores obtained in SABER 11 test are not part of the individual final grades of upper secondary education.
Administration	ICFES (*Instituto Colombiano para la Evaluación de la Educación*) is in charge of the design and administration of SABER tests. First administration date: 1968.
Former name	ICFES
Census	Since 1980, it became compulsory and is administered biannually. About 600,000 students take the test each year.
Target population	All students enrolled in Grade 11, the last year of upper secondary education level (ISCED 3).
Objectives	• To establish the level of competencies achieved by students at the end of high school. No consequential decisions are based on students' performance though. • To serve as a criterion for selecting students to enter some higher education institutions as well as to be eligible for financial aid and other educational benefits. • To monitor quality of upper secondary education supply. • To contribute to the development of educational research. • To produce information for estimating added-value studies on higher education.
What is assessed?	Previously centered in the assessment of contents, the test has adopted a competencies-based approach since 2000. Competencies for primary and secondary education are defined in the Basic Standards of Competencies by the Ministry of Education (MEN).

(continued)

Information collected	• Demographic and socio-economic data of students and their families. • Information about the school. • Information about the intended students' educational decisions after school. • Individual scores on average and in the different test's subjects.
Current structure*	Since 2014, the exam evaluates competencies in 5 subjects: Critical Reading; Mathematics; Natural Sciences; Social and Civic Sciences; English.
Type of questions	Each subtest consists of several multiple option questions. The 2014 version also includes for the first time a small group of open questions.
Target audience	The test provides valuable information to: • Students and their families: to guide career choices. • Schools: to guide pedagogical practices and institutional assessment processes. • Higher education institutions: to guide admission processes. • Governmental organizations: to construct and monitor quality indicators and to allocate students' financial aid for higher education. • Educational researchers: to conduct relevant, evidence-based studies.

Source: Own elaboration based on ICFES (2013a, 2015a).

Note: *The structure of SABER 11 between 2000 and 2007, which is the time period considered in this study, is described in Chapter 7. Due to several changes in the structure of the exam across time, different applications by semester have collected dissimilar information, using changing variables and measuring values differently. Therefore, comparisons between years are often difficult.

SABER PRO	
What is it?	It is a set of standardized state examinations that assesses individual competencies of final-year undergraduate students. Scores obtained in SABER PRO test are not part of the individual final grades of higher education.
Administration	ICFES (*Instituto Colombiano para la Evaluación de la Educación*) is in charge of the design and administration of SABER tests. First administration date: 2003.
Former name	ECAES (*Examen de Estado de Calidad de la Educación Superior*).
Census	It became mandatory for graduation by Law in 2009 (CRC, 2009) and it is administered once a year since 2014. About 300,000 students take the test each year.
Target population	Students enrolled in first-degree programs (ISCED 6) who have already passed 75% of credits.
Objectives	• To establish the level of competencies achieved by students at the time of graduation. No consequential decisions are based on students' performance though. • To provide information for the evaluation of institutional processes and to inform educational policy and decision making. • To produce indicators of higher education quality (e.g., learning outcomes, value-added estimates, performance trends). • To estimate valuable measures of value added by higher education institutions when combined with SABER 11 results.
What is assessed?	Individual generic and specific competencies. Generic competencies denote transferable skills which are independent of the field of study. Subject-specific competencies refer to specialized knowledge and skills in a certain subject.

(continued)

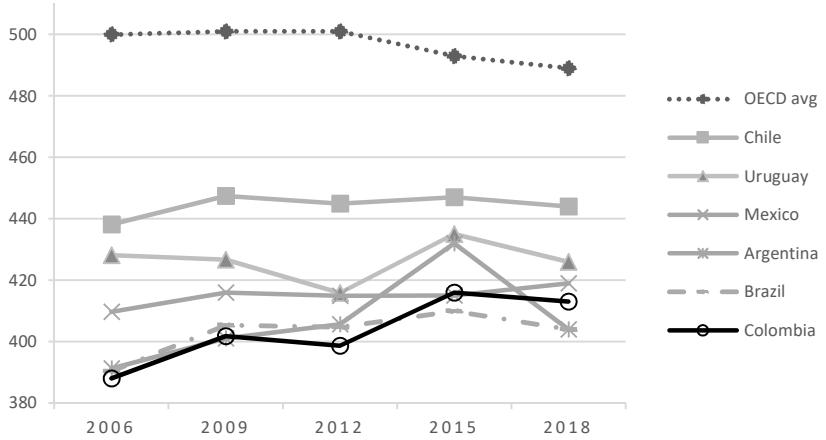
Information collected	• Demographic and socio-economic data of students and their families. • Information about the higher education institution. • Individual scores by module; there is no aggregated score for the whole battery of tests.
Current structure*	The most recent version of the tests consists of two components: generic and subject-specific. The former includes 5 modules: Reading/critical Thinking, Numerical Reasoning, Written Communication, Civic Competencies, and English. The latter is specific to clusters of study programs with similarities. Currently, there are 42 tests by reference group, which have been defined by the MEN using the National Higher Education Information System SNIES and the ISCED-UNESCO.
Type of questions	Each module of generic competencies consists of 35 multiple option questions, except for the Written Communication module that includes one open question. Specific competencies are divided into 1 to 3 modules, with sets of 40–60 questions each.
Target audience	The test provides valuable information to: • Students: for self-assessment. • Higher education institutions: to guide pedagogical practices and institutional assessment processes. • Governmental organizations: to construct and monitor quality indicators. • Educational researchers: to conduct relevant, evidence-based studies. • Employers: to guide selection processes for job positions.

Source: Own elaboration based on ICFES (2013a, 2015b, 2016).
Note: *The previous structure of SABER PRO during the time period considered in this study is described in Chapter 7.

Annex B: PISA Results from a Regional Perspective

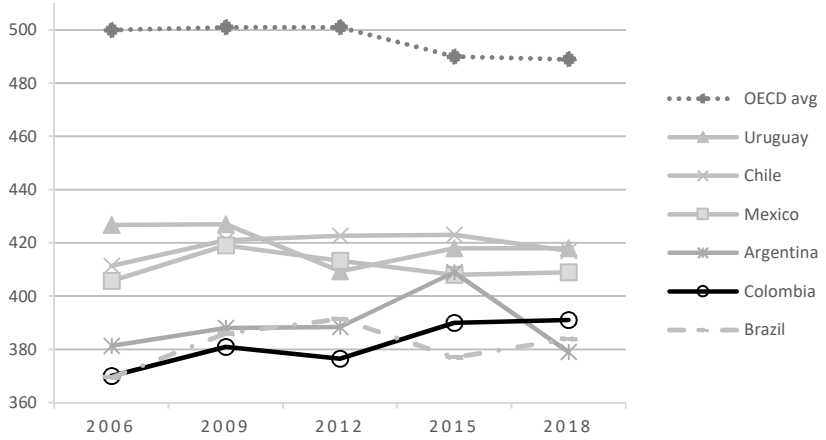
The following graphs detail the evolution of national scores obtained in the last five waves of PISA – namely 2006, 2009, 2012, 2015, and 2018 – in all three subjects assessed: reading, mathematics and science. Data are presented in comparison with other five Latin American countries who have participated in these waves: Argentina, Brazil, Chile, Mexico, and Uruguay. From a more international standpoint, the average of OECD countries is also included in each graph.

Graph B. 1: Science scores of Latin American countries (PISA 2006–2018)



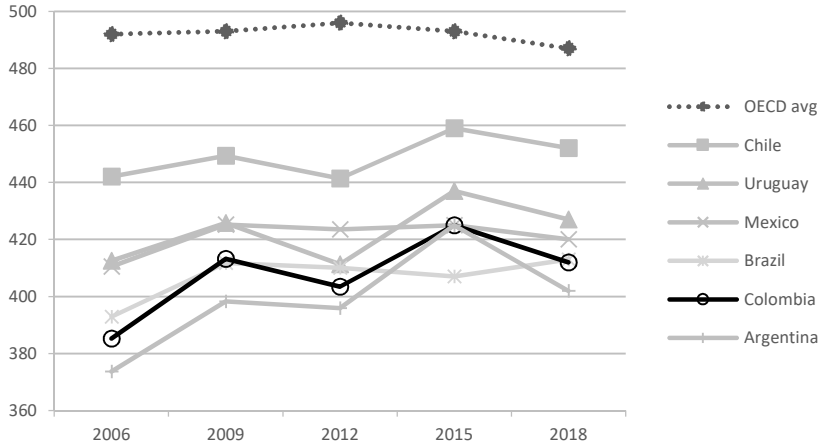
Source: Own elaboration based on data from OECD (2007, 2010, 2014, 2016d, 2019b).
Note: The PISA 2015 results for Argentina are showed here; however, they are not comparable since the sample did not cover the full target population, due to the potential omission of schools from the sampling frame (OECD, 2016c, p. 81).

Graph B. 2: Math scores of Latin American countries (PISA 2006–2018)



Source: Own elaboration based on data from OECD (2007, 2010, 2014, 2016d, 2019b).
Note: The PISA 2015 results for Argentina are showed here; however, they are not comparable since the sample did not cover the full target population, due to the potential omission of schools from the sampling frame (OECD, 2016c, p. 81).

Graph B. 3: Reading scores of Latin American countries (PISA 2006–2018)



Source: Own elaboration based on data from OECD (2007, 2010, 2014, 2016d, 2019b).
Note: The PISA 2015 results for Argentina are showed here; however, they are not comparable since the sample did not cover the full target population, due to the potential omission of schools from the sampling frame (OECD, 2016c, p. 81).

Annex C: Origins of Colombian Higher Education

The first universities in Colombia were founded by different Catholic religious orders sent by the Spanish Crown (mostly Dominicans, Franciscans, and Jesuits) during the sixteenth and seventeenth centuries. Three universities – *Universidad Santo Tomás*[157] (1580), *Pontificia Universidad Javeriana* (1623) and *Universidad del Rosario* (1653) – established in former privately-financed Catholic schools, were the only ones in the Viceroyalty of Nueva Granada[158] until the 19th century. The target student population of this colonial universities was both the Spanish and creole elite while their field of studies were mainly focused on Theology and Philosophy.

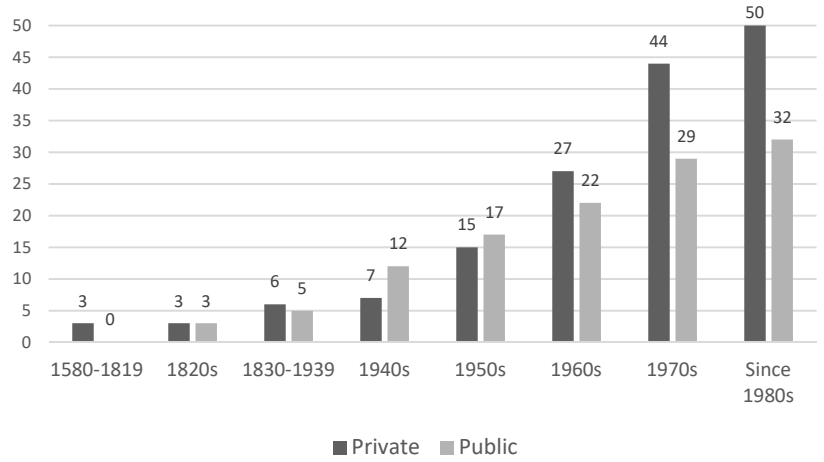
With the independence movement at the beginning of the 19th century, Spanish colonies adopted republican systems of government. The first public universities were founded during the 1820s in order to countervail the religious monopoly of higher education. Highly influenced by the French Napoleonic model around the idea of *profession libérale*, universities were organized in faculties (e.g. Medicine, Law, Philosophy and Letters, etc.) and oriented towards the purpose of educating "good citizens and building a new nation" (Burbano, 2008, p. 179). The main state universities were located in the country's major urban centers: the *Universidad Central* (1823), which was the main public university of the newly created state called Gran Colombia[159] with seats in Bogotá, Caracas and Quito, as well as universities in Cartagena, Popayán and Tunja (and soon afterwards in Antioquia and Pasto). With the dissolution of the Gran Colombia state in 1831 and the origin of the Republic of Colombia, the university located in Bogota was renamed in 1867, known today as the *Universidad Nacional de Colombia*. At the end of the 1820s there was a total of six universities, with the half being public, as can be seen in the graph below.

157 One of the oldest universities in the Hispanic America, together with *Universidad Autónoma de Santo Domingo* (1538), *Real Universidad de México* (1551), and *Universidad Nacional Mayor de San Marcos* (1551) in Lima.

158 *Virreinato de la Nueva Granada* (1717–1821) was a jurisdiction of the Spanish Empire in the northern South America, corresponding to Colombia, Ecuador, Panama, and Venezuela.

159 *Gran Colombia* was a State composed of the following today's nations: Colombia, Ecuador, Panama, and Venezuela, as well as some parts of Peru, Guyana, and Brazil.

Graph C.1: Number of universities founded by time period and sector



Source: Own elaboration with data from García (2008) and SNIES (2017).
Note: The graph shows the number of private/public universities founded by time period, excluding the non-university HEIs. The year of foundation, however, may be prior to recognition as university. Therefore, some of them might be classified as other types of HEIs before that.

Between the end of the 19th century and the beginning of the 20th, the first private secular universities appeared – *Universidad Externado* (1886), *Universidad Republicana* (1890-1923) and *Universidad Libre* (1923) – founded by a wing of the Liberal Party, the so-called *'radicales'*, who were against the conservative government as well as in opposition to the Church participation in educational matters.[160] In 1920, the Colombian university was transformed through a series of reforms, influenced by the *Manifiesto de Córdoba* (1918), a student movement originated in Argentina with echo in various Latin America nations, which supported the ideas of academic freedom and co-government, among others. National enrollment in higher education jumped from 200 students enrolled at colonial universities in 1810 to more than 3,000 in 1837 (IESALC, 2002). At the end of 1930s, there were 5 public and 6 private universities.

During the 1940s decade, there was a process of extending the public university to different country's regions and 7 new universities were founded in Caldas, Valle, Cundinamarca, Tolima, Atlántico, Santander and Norte de Santander. As

160 More details on the main ideas supported by the 'radical liberalism' for educational reforms and their impact during 19th and 20th centuries in Colombia can be found in Meisel (2011).

illustrated in the previous graph, the expansion of the public institutions continued over the subsequent decades, but at a slower rate than that followed by the private sector. Since the 1950s, various universities were founded by the initiative of national and local leaders – some by businessmen with resources from different corporations and sectors under the purpose of promoting economic development and the modernization of the main urban centers, and others by intellectuals who supported secular, non-religious and apolitical institutions (Uribe, 2013). Examples of these HEIs are: *U. de Los Andes* in Bogotá, *Eafit* in Medellín, *U. del Norte* in Barranquilla, *U. Tecnológica de Bolívar* in Cartagena, *U. Autónoma de Occidente* and *Icesi* in Cali, and *U. Autónoma de Manizales* (Burbano, 2008). From the 1960s decade, the number of private universities exceeded that of public ones and in 1973 private enrollment was for the first time much higher (Jiménez & Figueroa, 1999). The existing institutions recognized as universities amounted of 75 in 1992 (Gómez, 2015, p. 101) and 82 in 2016 (SNIES, 2017), most of which belong to the private sector and were founded between 1960s and 1970s. The table below lists of all HEIs that are currently recognized as universities, by year of foundation and sector.

Table C. 1: First Colombian universities by sector and year of foundation

Founded	Sector	University
1580	Private	U. de Santo Tomás
1623	Private	Pontificia U. Javeriana
1653	Private	U. Colegio Mayor del Rosario
1826	Public	U. Nacional de Colombia*
1827	Public	U. de Cartagena
1827	Public	U. del Cauca
1871	Public	U. de Antioquia**
1886	Private	U. Externado de Colombia
1904	Public	U. de Nariño
1923	Private	U. Libre
1936	Private	U. Pontificia Bolivariana
1943	Public	U. de Caldas
1945	Public	U. del Valle
1945	Public	U. Colegio Mayor de Cundinamarca
1945	Public	U. del Tolima
1946	Public	U. del Atlántico
1948	Public	U. Industrial de Santander
1948	Public	U. de Pamplona
1948	Private	U. de los Andes
1950	Public	U. Distrital Francisco José de Caldas

(continued)

Founded	Sector	University
1950	Private	U. de Medellín
1952	Private	U. Autónoma de Bucaramanga (UNAB)
1953	Public	U. Pedagógica y Tecnológica de Colombia
1953	Private	U. la Gran Colombia
1954	Private	Fundación U. de Bogotá Jorge Tadeo L.
1954	Private	U. Católica de Manizales
1955	Public	U. Pedagógica Nacional
1955	Private	U. Inca de Colombia
1956	Private	Fundación U. de América
1958	Public	U. del Magdalena
1958	Public	U. Tecnológica de Pereira
1958	Private	U. Santiago de Cali
1960	Private	U. EAFIT
1961	Public	U. del Quindío
1961	Private	U. San Buenaventura
1962	Public	U. de Córdoba
1962	Public	U. Francisco de Paula Santander
1962	Private	Corporación U. Piloto de Colombia
1963	Public	Escuela Naval de Cadetes Almirante Padilla
1964	Private	U. Cooperativa de Colombia
1964	Private	U. de la Salle
1966	Private	Fundación U. Central
1966	Private	U. del Norte
1966	Private	U. Autónoma Lat. (UNAULA)
1967	Private	U. Mariana
1967	Private	U. EAN
1967	Private	U. Autónoma del Caribe
1969	Public	U. de Cundinamarca UDEC
1969	Private	U. Autónoma de Occidente
1970	Public	U. Surcolombiana
1970	Private	U. Católica de Colombia
1970	Private	U. Tecnológica de Bolívar
1971	Public	U. de La Amazonia
1972	Public	U. Tecno. del Chocó Diego Luis Córdoba
1972	Private	Fundación U. Autónoma de Colombia (FUAC)
1972	Private	U. Simón Bolívar
1972	Private	U. de Manizales
1974	Public	U. de los Llanos
1974	Private	U. Metropolitana
1974	Private	Corp. U. del Sinú Elías Bechara Zainum (UNISINU)
1975	Private	U. Manuela Beltrán UMB
1976	Public	U. Popular del Cesar
1977	Public	U. de la Guajira
1977	Public	U. de Sucre
1977	Private	U. Antonio Nariño
1977	Private	U. CES

(continued)

Founded	Sector	University
1977	Private	U. ECCI
1978	Private	U. El Bosque
1978	Private	U. EIA
1979	Private	U. de la Sabana
1979	Private	U. de Boyacá (UNIBOYACA)
1979	Private	U. ICESI
1979	Private	U. Autónoma de Manizales
1980	Public	U. Militar Nueva Granada
1980	Private	U. de Ibagué
1981	Public	U. Nacional Abierta y a Distancia (UNAD)
1982	Private	U. de Santander
1982	Private	U. Católica de Oriente
1983	Private	U. de Cs. Aplicadas y Ambientales (UDCA)
1984	Private	U. Católica Luis Amigó
1985	Private	U. Sergio Arboleda
1988	Public	U. del Pacífico

Source: Own elaboration based on data from García (2008) and SNIES (2017).

Notes: The list corresponds to the HEIs recognized as universities by the Colombian state until 2016 and does not include 'university institutions'. The year of foundation, however, may be prior to recognition as university. Some of them were classified as other types of HEIs before that.

*Originally founded as Universidad Central and reestablished as Universidad Nacional de los Estados Unidos de Colombia in 1867.

**Originally founded as Colegio de la Nueva Fundación de San Francisco in 1803 and renamed as Colegio de Antioquia in 1827.

Annex D: The Colombian Higher Education in Figures

Table D. 1: Total Enrollment in ISCED 5–6 programs (2000–2019)

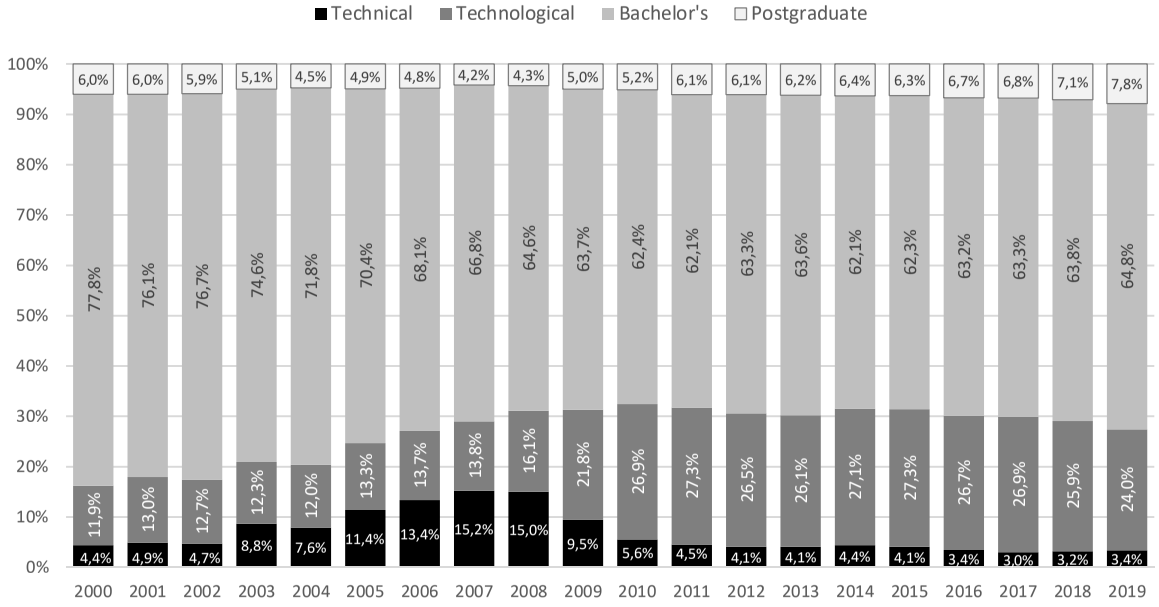
Year	Population 17–21 years	ISCED 5 Technical	ISCED 5 Technological	ISCED 6 Bachelor	ISCED 5-6*	GER** (%)
2000	3,663,687	40,768	110,427	724,305	875,500	23.9%
2001	3,706,309	48,061	126,363	740,314	914,738	24.7%
2002	3,735,043	45,502	122,851	742,262	910,615	24.4%
2003	3,754,953	84,674	130,419	787,595	1,002,688	26.7%
2004	3,942,893	84,648	133,121	799,979	1,017,748	25.8%
2005	4,001,081	136,533	159,112	842,127	1,137,772	28.4%
2006	4,064,849	171,386	175,862	872,720	1,219,968	30.0%
2007	4,124,212	207,188	188,249	910,228	1,305,665	31.7%
2008	4,180,964	224,026	239,954	963,167	1,427,147	34.1%
2009	4,236,086	150,641	347,741	1,015,608	1,513,990	35.7%
2010	4,284,916	92,941	449,686	1,045,133	1,587,760	37.1%
2011	4,319,415	84,183	508,733	1,159,512	1,752,428	40.6%
2012	4,342,603	78,543	510,671	1,218,816	1,808,030	41.6%
2013	4,354,649	83,726	532,199	1,296,123	1,912,048	43.9%
2014	4,356,453	96,707	597,147	1,369,149	2,063,003	47.4%
2015	4,349,823	93,970	628,492	1,431,983	2,154,445	49.5%
2016	4,336,577	82,585	638,499	1,513,201	2,234,285	51.5%
2017	4,317,994	73,263	658,579	1,548,485	2,280,327	52.8%
2018	4,297,425	78,474	630,928	1,557,594	2,266,996	52.8%
2019	4,278,733	81,805	574,730	1,552,078	2,208,613	51.6%

Source: Own elaboration using DANE (2020) and SNIES (2020).

Notes: *The information corresponds to the total number of people who formalize the enrollment process in an undergraduate program (ISCED 5–6). Given the characteristics of this level of education, the data is estimated by adding the data reported by the HEIs to the SNIES in the first semester every year plus that reported by the SENA in the second semester.

**GER: gross enrollment ratio.

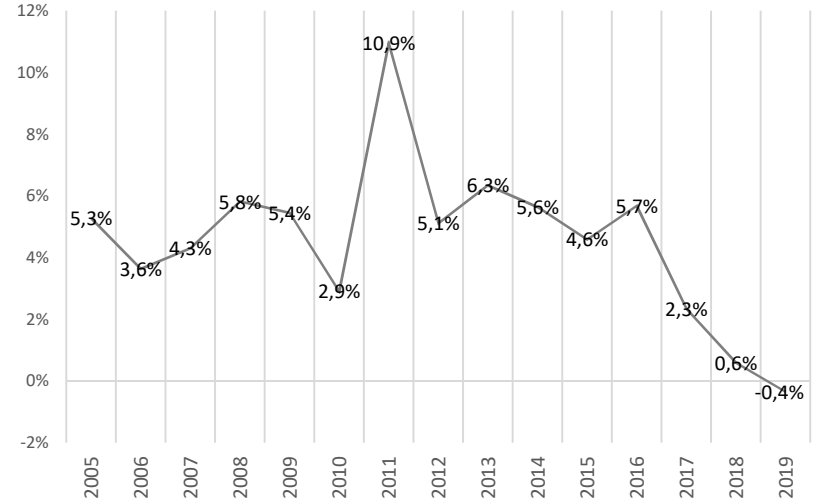
Graph D. 1: Share of total enrollment by program level, ISCED 5–8 (2000–2019)



Source: Own elaboration based on SNIES (2020).

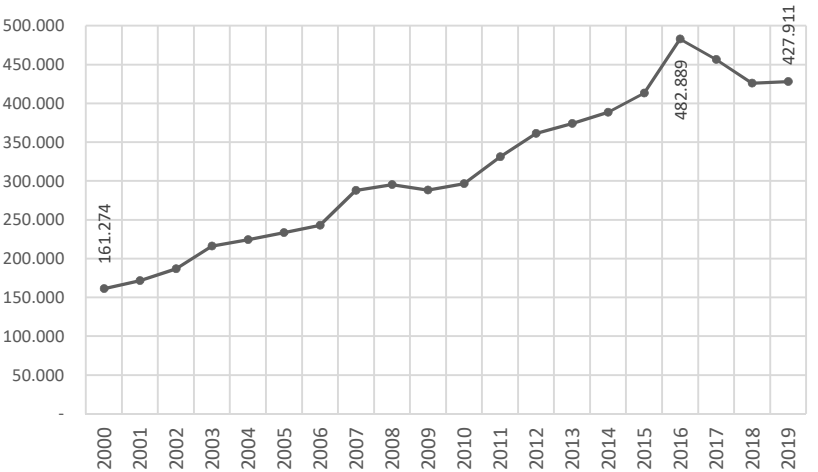
Note: ISCED 5: technical professional and technological programs; ISCED 6: bachelor's programs; ISCED 7–8: postgraduate education (includes 'specialization', master's, and doctoral programs). Since 2016, official statistics include medical and surgical specialties as well as postgraduate T&T programs as part of the 'specialization' category.

Graph D. 2: Annual percentage change rate in enrollment, ISCED 6 (2005–2019)



Source: Own elaboration using SNIES (2020).

Graph D. 3: First-year students enrolled in undergraduate programs, ISCED 6 (2000–2019)



Source: Own elaboration using SNIES (2020).

Table D. 2: Higher education institutions with high-quality accreditation by type and sector (2019)

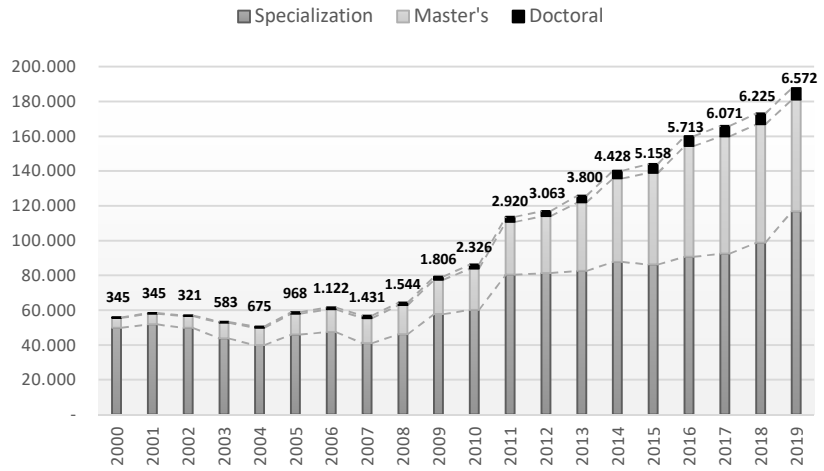
Type	Sector	HEI
Technological Inst.	Public	Escuela de Formación de Infantería de Marina
Technological Inst.	Public	Escuela de Suboficiales de la Fuerza Aérea Colombiana
Technological Inst.	Public	Escuela Naval de Suboficiales Barranquilla
University Inst.	Public	Dirección Nacional de Escuelas
University Inst.	Public	Colegio Mayor de Antioquia
University Inst.	Public	Tecnológico de Antioquia
University Inst.	Public	Instituto Tecnológico Metropolitano
University Inst.	Public	Escuela Militar de Aviación Marco Fidel Suárez
University Inst.	Public	Escuela Militar de Cadetes General José María Córdova
University Inst.	Private	Fundación Universitaria de Ciencias de la Salud
University Inst.	Private	Colegio de Estudios Superiores de Administración
University Inst.	Private	Escuela Colombiana de Ingeniería Julio Garavito
University Inst.	Private	Fundación Universitaria Antonio de Arévalo
University	Public	Escuela Naval de Cadetes Almirante Padilla
University	Public	Universidad de Antioquia
University	Public	Universidad de Caldas
University	Public	Universidad de Cartagena
University	Public	Universidad de Córdoba
University	Public	Universidad del Atlántico
University	Public	Universidad del Cauca
University	Public	Universidad del Magdalena
University	Public	Universidad del Quindío
University	Public	Universidad del Tolima
University	Public	Universidad del Valle
University	Public	Universidad de Nariño
University	Public	Universidad Distrital Francisco José de Caldas
University	Public	Universidad Industrial de Santander
University	Public	Universidad Militar Nueva Granada
University	Public	Universidad Nacional de Colombia
University	Public	Universidad Pedagógica Nacional
University	Public	Universidad Pedagógica y Tecnológica de Colombia
University	Public	Universidad Surcolombiana
University	Public	Universidad Tecnológica de Pereira
University	Private	Pontificia Universidad Javeriana
University	Private	Universidad Santo Tomás
University	Private	Universidad Externado de Colombia
University	Private	Fundación Universidad de Bogotá Jorge Tadeo Lozano
University	Private	Universidad Central
University	Private	Universidad Pontificia Bolivariana
University	Private	Universidad de la Sabana
University	Private	Universidad EAFIT
University	Private	Universidad del Norte
University	Private	Colegio Mayor de Nuestra Señora del Rosario
University	Private	Universidad de San Buenaventura
University	Private	Universidad Católica de Colombia
University	Private	Universidad de Manizales
University	Private	Universidad Católica de Oriente
University	Private	Universidad Sergio Arboleda
University	Private	Universidad El Bosque

(continued)

Type	Sector	HEI
University	Private	Universidad Manuela Beltrán
University	Private	Universidad de La Salle
University	Private	Universidad Libre
University	Private	Universidad de Los Andes
University	Private	Universidad Autónoma de Bucaramanga
University	Private	Universidad Autónoma de Manizales
University	Private	Universidad Antonio Nariño
University	Private	Universidad Católica de Manizales
University	Private	Universidad Icesi
University	Private	Universidad Autónoma de Occidente
University	Private	Universidad de Ibagué
University	Private	Universidad Tecnológica de Bolívar
University	Private	Universidad del Sinú Elías Bechara Zainum
University	Private	Universidad de Ciencias Aplicadas y Ambientales
University	Private	Universidad CES
University	Private	Universidad Simón Bolívar
University	Private	Corporación Universidad de la Costa
University	Private	Universidad EAN
University	Private	Universidad EIA

Source: Own elaboration using SNIES (2020).

Graph D. 4: Enrollment in Postgraduate Programs (2000–2019)



Source: Own elaboration using SNIES (2020).
Note: Bold numbers in the graph denote the total of students enrolled in doctoral programs.

Annex E: National Higher Education Information Systems

Information system	Objectives	Sources	Target audience
SACE: Higher Education Quality Assurance System	• Aims to keep track of the programs and institutions on the Qualified Registry and those granted high quality accreditation.	• HEIs include in this tool information on the institutional procedures related to the Official Registration among others.	HEI administrators.
SNIES: National Higher Education Information System	• Aims to support planning, monitoring, evaluation, inspection and supervision of higher education. • It is a comprehensive system including data on institutions, programs, teaching staff, students, research, internationalization, tuition fees, etc.	• Collects data from registered HEI administrators entering information online on a regular basis.	HEIs, higher education and upper secondary students and their families, career counselors, employers and entrepreneurs, researchers, governmental and non-governmental organizations.
SPADIES: System for the Prevention and Analysis of Higher Education Dropout	• Aims to monitor recruitment, retention and dropout rates from higher education institutions by student characteristics.	• Collects information on trajectories of students throughout the higher education system from SNIES, ICFES and ICETEX.	HEIs, higher education students, researchers, governmental and non-governmental organizations.
OLE: Labor Observatory for Education	• Aims to monitor and analyze information on higher education graduates' profiles, average salaries and links to the formal economy.	• Collects information on higher education graduates, employment and labor market trends from the SNIES, Ministry of Social Protection and Ministry of Finance and Public Credit.	HEIs, higher education and upper secondary students and their families, career counselors, employers and entrepreneurs, researchers, governmental and non-governmental organizations.

Source: Own elaboration based on MEN (n.d.).
Notes: HEI: higher education institution.

Annex F: Factors Associated with Learning in Colombian Secondary Education (Selected Studies)

			Social Origin		Class-room	School							Sys-tem	Context	
			(1) *	(2) *	(3) *	(4) *	(5) *	(6) *	(7) *	(8) *	(9) *	(10) *	(11) *	(12) *	(13) *
Study	**Scope**	**Data**													
Barrera, Maldonado, and Rodríguez (2012)	National	PISA (2006, 2009); SABER 5, 9, 11 (2009)	SS	PE (mother)					X	X				X	X
Bonet (2005)	National	Policies (1968–1995)	N/A	N/A									X		X
Bonilla (2011a)	National	SABER 11 (2009)	HI	PE (mother)					X	X	X	X		X	
Bonilla and Galvis (2011)	National	SABER 11 (2009)	HI	PE (both)		X			X	X	X				X
Correa (2011)	Cali	SABER 11 (2001)	HI	PE (highest)			X		X	X		X			
Gamboa and Waltenberg (2012)	Latin America	PISA (2006, 2009)	-	PE (both)					X						
García and Quiroz (2011)	National	SABER 11 (2009)	SS	PE (both)					X						
García, Fernández, and Weiss (2012)	National	PISA (2009)	N/A	N/A						X					
García, Espinosa, Jiménez, and Parra (2013)	National	SABER 11 (2011)	SS, HI, family size	PE (both), I, C					X					X	X
García, Maldonado, Perry, Rodríguez, and Saavedra (2014)	National	SABER 11 (2011)	N/A	N/A		X									

(continued)

Study	Scope	Data	Social Origin		Class-room	School							System	Context	
			(1)*	(2)*	(3)*	(4)*	(5)*	(6)*	(7)*	(8)*	(9)*	(10)*	(11)*	(12)*	(13)*
García, Maldonado, Perry, Rodríguez, and Saavedra (2014)	National	SABER 11 (2011)	N/A	N/A		X									
Gaviria and Barrientos (2001a)	Bogota	SABER 11 (1999)	HI	PE (highest)					X	X	X	X			
Gaviria and Barrientos (2001b)	Bogota	SABER 11, C-600, C-100 (1999)	HI	PE (both)	X	X	X		X	X		X			
Iregui, Melo, and Ramos (2007)	National	SABER 11 (2002)	HI	-	X	X	X		X		X			X	
Núñez, Steiner, Cadena, and Pardo (2002)	National	SABER 11 (1999)	HI	PE (both)					X						
Piñeros and Rodriguez (1998)	National	SABER 11 (1997)	HI	-				X		X					
Rangel and Lleras (2010)	Cartagena	SABER 11 (2003), C-600, C-100	SES					X							
Restrepo and Alviar (2004)	Antioquia	SABER 11 (1999)	PO	PE (highest)			X		X	X		X			

Source: Own elaboration.

Notes: C: Computer; I: Internet; HI: household income; PE: parental education (both parents' education; mother's education; the parents' highest educational attainment); PO: parental occupation; SES: socio-economic status; SS: socio-economic strata; N/A: not applicable.

*List of factors: (1) economic resources; (2) cultural resources; (3) class size; (4) teachers' characteristics; (5) school resources; (6) student composition; (7) private/public sector; (8) school day; (9) school calendar; (10) curriculum; (11) organizational issues; (12) region; (13) rural/urban.

Annex G: Descriptive Statistics

Table G. 1: Social origin variables

Variable	Frequency	Percent	Mean	SD	Min.	Max.
Birth cohort (control)	16,882		1986.15	0.90	1983	1988
1983	132	0.78				
1984	729	4.32				
1985	2,342	13.87				
1986	7,509	44.48				
1987	5,647	33.45				
1988	523	3.10				
Graduation cohort (control)	16,875		2009.66	0.82	2007	2011
2007	95	0.56				
2008	1,257	7.45				
2009	5,167	30.62				
2010	8,094	47.96				
2011	2,262	13.40				
Sex (control)	16,385		0.60	0.49	0	1
Male	6,512	39.74				
Female	9,873	60.26				
Family income (in SMMLV*)	14,214		3.26	1.57	1	10
Less than 1	1,218	8.57				
Between 1 and <2	3,810	26.80				
Between 2 and <3	3,564	25.07				
Between 3 and <5	3,164	22.26				
Between 5 and <7	1,706	12.00				
Between 7 and <9	263	1.85				
Between 9 and <11	134	0.94				
Between 11 and <13	148	1.04				
Between 13 and <15	82	0.58				
15 or more	125	0.88				
Father's occupation	15,758		5.27	2.36	1	12
Entrepreneurs	600	3.81				
Managing directors/chief executives	879	5.58				
Independent professionals	1,625	10.31				
Employed professionals	2,741	17.39				
Independent workers	4,350	27.61				
Employed workers	2,413	15.31				
Stockholders	140	0.89				
Manual workers	1,311	8.32				
Retired	1,040	6.60				
Domestic/house tasks	46	0.29				
Students	17	0.11				
Unemployed	596	3.78				

(continued)

Variable	Frequency	Percent	Mean	SD	Min.	Max.
Mother's occupation	16,265		7.14	2.94	1	12
Entrepreneurs	256	1.57				
Managing directors/chief executives	50	3.08				
Independent professionals	758	4.66				
Employed professionals	2,649	16.29				
Independent workers	2,011	12.36				
Employed workers	2,113	12.99				
Stockholders	113	0.69				
Manual workers	393	2.42				
Retired	349	2.15				
Domestic/house tasks	6,632	40.77				
Students	82	0.50				
Unemployed	408	2.51				
Father's education	16,877		5.35	1.80	1	8
None	223	1.32				
ISCED 0	48	0.28				
ISCED 1	2,990	17.72				
ISCED 2	3,496	20.71				
ISCED 3	2,060	12.21				
ISCED 5	1,880	11.14				
ISCED 6	4,012	23.77				
ISCED 7-8	2,168	12.85				
Mother's education	16,874		5.21	1.68	1	8
None	106	0.63				
ISCED 0	38	0.23				
ISCED 1	2,724	16.14				
ISCED 2	4,408	26.12				
ISCED 3	2,509	14.87				
ISCED 5	1,870	11.08				
ISCED 6	3,532	20.93				
ISCED 7-8	1,687	10.00				
House ownership	16,673		2.31	0.79	1	3
Rented place	3,448	20.68				
Family-owned property (partially paid)	4,637	27.81				
Family-owned property (fully paid)	8,588	51.51				

Source: Own elaboration.

Notes: *SMMLV: *Salario Mínimo Mensual Legal Vigente* stands for the monthly minimum wage. As of 2002, 1 SMMLV was COP 309,000 equivalent to USD 123.3 (OECD, 2020a).
SD: standard deviation.

Table G. 2: Student academic performance variables

Variable	Frequency	Mean	SD	Min.	Max.
SABER 11 scores					
S11: Language test score	16,899	7.68		28	103
S11: Biology test score	16,899	5.95		23	86
S11: Math test score	16,899	6.19		12	103
S11: Philosophy test score	16,898	5.63		18	75
S11: Physics test score	16,899	6.74		16	81
S11: History test score	16,899	5.37		23	72
S11: Chemistry test score	16,899	7.19		18	92
S11: Geography test score	16,899	6.68		21	76
Global SABER 11 score (factorial)	16,881	0.00	2.00	-8	8
SABER PRO scores					
Reading comprehension score (standardized by year)	16,882	0.00	1.00	-12	5

Source: Own elaboration.

Table G. 3: Upper secondary education variables

Variable	Frequency	Percent	Mean	SD	Min.	Max.
School sector	16,882		0.58	0.49	0	1
Public	7,053	41.78				
Private	9,829	58.22				
Monthly tuition fees (in COP*)	16411		4.72	2.55	1	8
No cost	3,672	22.38				
Less than 30 M	683	4.16				
Between 30 and <50 M	807	4.92				
Between 50 and <70 M	1,679	10.23				
Between 70 and <100 M	2,232	13.60				
Between 100 and <150 M	2,320	14.14				
Between 150 and <250 M	1,864	11.36				
250 M or more	3,154	19.22				
School day	16,882		1.78	0.67	1	3
Full day	5,979	35.42				
Half day (morning)	8,602	50.95				
Half day (evening)	2,301	13.63				
School curriculum orientation	16,875		1.41	0.54	1	3
Academic	10,240	60.68				
Vocational	6,209	36.79				
"Escuela Normal"	426	2.52				
School location	16,882		0.70	0.46	0	1
Other municipality	5,138	30.43				
Capital of country department	11,744	69.57				
School calendar	16,899		1.18	0.43	1	3
A calendar	14,120	83.51				
B calendar	2,487	14.71				
F calendar	301	1.78				

Source: Own elaboration.

Notes: *COP: Colombian pesos (as for 2002, USD 1 was equivalent to COP 2,504) (OECD, 2020a).
M: thousands; MM: millions; SD: standard deviation.

Table G. 4: Higher education variables

Variable	Frequency	Percent	Mean	SD	Min.	Max.
HEI sector	16,873		0.59	0.49	0	1
Public	6,861	40.66				
Private	10,012	59.34				
Semester tuition fees (in COP*)	15,998		2.89	1.41	0	5
None	217	1.36	1.36			
<500M	3,747	23.42	24.78			
Between 500M and <1MM	1,784	11.15	35.93			
Between 1 and <3MM	4,737	29.61	65.54			
Between 3 and <5MM	2,852	17.83	83.37			
5MM or more	2,661	16.63	100.00			
HEI type	16,873		0.87	0.34	0	1
University institution	2,268	13.44				
University	14,605	86.56				
Percentage of academic staff with master's or doctoral degrees	16,882		1.48	0.78	0	3
None	1,068	6.33				
Less than 30%	8,605	50.97				
Between 30 and 60%	5,292	31.35				
More than 60%	1,917	11.36				
Program with high quality accreditation	16,882		0.41	0.49	0	1
No	9,954	58.96				
Yes	6,928	41.04				

Source: Own elaboration.

Notes: *COP: Colombian pesos (as for 2010, USD 1 was equivalent to COP 1,899) (OECD, 2020a).
M: thousands; MM: millions; SD: standard deviation.

Table G. 5: Individual's income variable

Variable	Frequency	Mean	SD	Min.	Max.
Gross income (in COP*)	16,882	1,534,659	1,080,821	515,000	13,400,000
Gross income (in USD*)	16,882	808	569	271	7,056

Source: Own elaboration.

Notes: *COP: Colombian pesos (as for 2010, USD 1 was equivalent to COP 1,899) (OECD, 2020a).

Annex H: Variable Construction

Table H. 1: JCA among parental education variables

	Total		Dimension 1		Dimension 2	
Variable	Mass	% Inertia	Score	Contribution	Score	Contribution
Father's education						
None / Pre-primary	0.01	0.03	-1.63	0.02	1.43	0.02
ISCED 1	0.09	0.17	-1.63	0.24	1.01	0.09
ISCED 2	0.10	0.06	-0.59	0.04	-0.84	0.07
ISCED 3	0.06	0.05	0.15	0.00	-1.47	0.13
ISCED 5	0.06	0.02	0.39	0.01	-0.91	0.05
ISCED 6	0.12	0.07	0.92	0.10	0.29	0.01
ISCED 7-8	0.06	0.10	1.23	0.10	1.43	0.13
Mother's education						
None / Pre-primary	0.00	0.03	-2.02	0.02	2.01	0.02
ISCED 1	0.08	0.17	-1.74	0.24	1.07	0.09
ISCED 2	0.13	0.06	-0.52	0.04	-0.79	0.08
ISCED 3	0.08	0.05	0.23	0.00	-1.35	0.14
ISCED 5	0.06	0.03	0.57	0.02	-0.58	0.02
ISCED 6	0.11	0.09	1.04	0.11	0.61	0.04
ISCED 7-8	0.05	0.08	1.17	0.07	1.53	0.12
Inertia	0.67		0.41		0.14	
% Inertia	100.00		61.09		21.46	
n						**16,879**

Source: Own elaboration.

Table H. 2: JCA among type of school variables

	Total		Dimension 1		Dimension 2	
Variable	Mass	% Inertia	Score	Contri-bution	Score	Contri-bution
School day						
Full day	0.072	0.081	0.958	0.066	1.892	0.256
Half day (morning)	0.103	0.010	-0.265	0.007	-0.582	0.035
Half day (evening)	0.025	0.079	-1.618	0.067	-2.961	0.224
School curriculum						
Academic	0.121	0.057	0.714	0.062	-0.180	0.004
Vocational	0.079	0.087	-1.087	0.094	0.275	0.006
School sector						
Private	0.117	0.239	1.487	0.259	-0.301	0.011
Public	0.083	0.338	-2.103	0.366	0.425	0.015
School calendar						
A	0.170	0.005	-0.161	0.004	-0.216	0.008
B	0.030	0.027	0.911	0.025	1.226	0.045
School location						
Capital city	0.139	0.024	0.333	0.015	-0.933	0.121
Other municipalities	0.061	0.054	-0.759	0.035	2.127	0.276
Inertia	0.057		0.052		0.004	
% Inertia	100.00		91.7		8.1	
n						**16,875**

Source: Own elaboration.

Table H. 3: Eigenvectors for PCA of SABER 11 test scores

Variable	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8	Unex-plained
Language	0,38	0,21	-0,19	0,09	-0,50	0,71	0,14	0,07	0
Biology	0,39	-0,05	-0,21	-0,07	-0,44	-0,64	0,29	0,34	0
Math	0,29	-0,46	0,61	0,54	0,01	0,06	0,04	0,15	0
Philosophy	0,24	0,72	0,61	-0,18	0,03	-0,13	-0,03	-0,01	0
Physics	0,34	-0,34	0,10	-0,71	0,31	0,23	-0,01	0,31	0
History	0,36	0,20	-0,30	0,29	0,66	0,00	0,46	-0,05	0
Chemistry	0,41	-0,22	0,01	-0,16	-0,12	-0,12	-0,04	-0,85	0
Geography	0,39	0,10	-0,27	0,20	0,13	-0,09	-0,82	0,15	0

Source: Own elaboration.

Table H. 4: JCA among HEI type variables

	Total		Dimension 1		Dimension 2	
Variable	Mass	% Inertia	Score	Contribution	Score	Contribution
HEI sector						
Public	0.21	0.22	-1.18	0.29	0.00	0.00
Private	0.29	0.16	0.85	0.21	0.00	0.00
Semester tuition fees (in COP*)						
No tuition fees	0.01	0.23	-1.03	0.01	11.52	0.90
<500M	0.12	0.18	-1.36	0.22	-0.76	0.07
Between 500M and <1MM	0.06	0.07	-1.26	0.09	0.53	0.02
Between 1 and <3MM	0.15	0.03	0.50	0.04	-0.26	0.01
Between 3 and <5MM	0.09	0.06	0.92	0.08	0.02	0.00
5MM or more	0.08	0.06	0.96	0.08	0.20	0.00
Inertia	0.99		0.74		0.25	
% Inertia	100		74.8		25.2	
n						**16,005**

Source: Own elaboration.

Notes: *COP: Colombian pesos (as for 2002, USD 1 was equivalent to COP 2,504) (OECD, 2020a).
M: thousands. MM: millions.

Table H. 5: JCA among HEI quality variables

Variable	Total		Dimension 1		Dimension 2	
	Mass	% Inertia	Score	Contri-bution	Score	Contri-bution
Program with high quality accreditation						
No	0.20	0.12	-0.94	0.17	-0.12	0.00
Yes	0.14	0.18	1.34	0.25	0.18	0.00
Institutional differentiation						
University institution	0.05	0.13	-1.64	0.12	1.83	0.15
University	0.29	0.02	0.26	0.02	-0.28	0.02
Percentage of academic staff with M.A or Ph.D. degrees						
0%	0.02	0.20	-2.06	0.09	4.76	0.48
Less than 30%	0.17	0.14	-0.73	0.09	-1.21	0.25
Between 30 and 60%	0.11	0.06	0.79	0.07	0.52	0.03
More than 60%	0.04	0.16	2.28	0.20	1.33	0.07
Inertia	0.28		0.20		0.08	
% Inertia	100		71.87		28.13	
n						**16,883**

Source: Own elaboration.